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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DON CAMERON ALLEN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

WEDNESDAY, MAY 20, 1931, 4 P.M.
Room 108, Administration Building

COMMITTEE IN CHARGE:
- PROFESSOR THOMAS W. BALDWIN, *Chairman*
- PROFESSOR EDWARD C. BALDWIN
- PROFESSOR GEORGE T. FLOM
- PROFESSOR WALTER GRAHAM
- PROFESSOR HARRY S. V. JONES
- PROFESSOR MATTHEW T. McCLURE

OUTLINE OF STUDIES

Major Subject: English

First Minor Subject: Philology

Second Minor Subject: Philosophy

Thesis: A CRITICAL EDITION OF FRANCIS MERES'S TREATISE 'POETRIE'

Summary of Chapters I and II of the Introduction

For almost a hundred years Francis Meres (1565-1647) has been considered by the majority of English and American scholars as one of the foremost classicists and literary critics of the English Renaissance. His reputation as a classical scholar has rested on the vast number of classical quotations that adorn his work and on his seeming familiarity with the works of many obscure poets of antiquity. His renown as a critic has been based upon his apparent knowledge of English poets and on the attempt that he makes to compare them with the poets of Greece and Rome. This reputation is undeserved, for a study of the background reveals that in both structure and content the treatise is the joint product of a mediocre man and of the educational system of the period.

The curriculum of the lower schools of the Sixteenth Century is characterized by its stress upon the speaking and writing of Latin and by its sanction of imitation and literal borrowing. The "imitatio" method may be further illustrated by the three types of subsidiary text-books: the quotation book as the *Polyanthea* of Mirabellus, the epithet book as the *Epitheta* of Textor, and the compendium of universal knowledge as the *Officina* of Textor. The same sort of educational method seems to have been continued in the universities, where the lack of competent scholars and the formula method of the curriculum prevented the ordinary student from obtaining a broad culture. The result of this Latin-imitatio method may be clearly discerned in the treatise "Poetrie."

The structure of the treatise, for which Meres has been praised, was attempted by Lando and Carew at an earlier date and seems to have been something that was in vogue. The information about the classical poets is translated from the *Officina* of Textor and the classical quotations have been paraphrased from a quotation book of the nature of the *Polyanthea* or the *Parabolae* of Erasmus. The few items that do not appear in these works may be traced to the *Bibliotheca* of Gesner which Meres knew and to the *De Poetis Latinis* of Crinitus which he would know through Textor's acknowledgment. A survey of the critical opinions of Italian, German, French, Spanish, Dutch, and English scholar-critics of the Renaissance indicates that Meres had no tangible critical system and that his listings are probably made on the basis of comparative literary genres. A further survey reveals that for the most part his critical opinions about the English poets are imitated from the writings of Ascham, Sidney, Puttenham, Webbe, and Nash.

EDUCATIONAL CAREER

A.B., University of Illinois, 1926

M.A., Washington University, 1927

Scholar in English, Washington University, 1926-1927

Assistant in English, University of Illinois, 1927-1928

Fellow in English, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DARRELL ALTHAUSEN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, October 26, 1931, 4 p. m.
Room 176, Chemistry Building

THE LIBRARY OF THE
OCT 23 1931
UNIVERSITY OF ILLINOIS.

Committee in Charge:
- Professor Carl S. Marvel, Chairman
- Professor John H. Reedy
- Professor Worth H. Rodebush
- Professor Ralph L. Shriner
- Doctor Leonard L. Steimley

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Mathematics

Thesis: REARRANGEMENTS OF HEXA-SUBSTITUTED ACETYLENIC ETHANES

Summary

1. The structural formula of a di–indene derivative has been assigned to the hydrocarbon $C_{38}H_{38}$, obtained by the rearrangement of tetraphenyl–di–*tert.*–butylethinylethane or by the action of silver on diphenyl–*tert.*–butylethinylbromomethane.

2. A mechanism has been proposed to account for the formation of this hydrocarbon.

3. The effect of various reagents upon the hydrocarbon has been studied.

4. A sufficient number of oxidation and reduction products of the hydrocarbon have been characterized and identified to substantiate the di–indene formula.

5. Several synthetic experiments, whose purpose was the synthesis of decomposition products of the di–indene, are described.

EDUCATIONAL CAREER

B.S., University of Oklahoma, 1926

Assistant in Chemistry, University of Illinois, 1928-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

OSCAR FRITIOF ANDER

FOR THE

Degree of Doctor of Philosophy

Thursday, January 29, 1931, 7:30 p.m.
Room 424A Library

THE LIBRARY OF THE
JAN 27 1931
UNIVERSITY OF ILLINOIS.

Committee in Charge:

- Professor Marcus L. Hansen, Chairman
- Professor Laurence M. Larson
- Professor Albert H. Lybyer
- Professor Laurence J. Norton
- Professor Theodore C. Pease
- Professor William S. Robertson

OUTLINE OF STUDIES

Major Subject: History
First Minor Subject: American History
Second Minor Subject: Economics

Thesis: THE CAREER AND INFLUENCE OF T. N. HASSELQUIST, A SWEDISH-AMERICAN CLERGYMAN, JOURNALIST AND EDUCATOR

Summary

T. N. Hasselquist, born in Sweden in 1816, came to America in 1852. His education, his experiences as a clergyman in the Swedish State Church and his personality commanded respect among the Swedish settlers in America. These immigrants were suffering from the lack of leadership. They were widely scattered and divided in religious and political opinions. Hasselquist became their self-appointed leader. In 1855, he founded the first Swedish-American newspaper, through which he sought to unite the Swedes in religion and politics. Largely through these efforts, the Swedes were won by the Republican Party, and the success of the Reformed Churches in securing converts among the Swedish immigrants was partly checked.

In 1860, these Swedish Lutherans and a few Norwegian Lutherans formed the Augustana Synod, from which the Norwegians separated in 1870. There was danger that this organization would share the seemingly "unavoidable fate" of immigrant churches in America: division into small mutually-antagonistic independent bodies. But the Augustana Synod occupies a unique place among the immigrant churches in that it has remained one united Swedish Lutheran Church. Hasselquist as an organizer and missionary, as the President of the Synod (1860-70), as the President of Augustana College and Theological Seminary (1863-1891), as an editor (1855-1889), as the founder of the Swedish American Publication House, was chiefly responsible for this unity. He also left his influence through his puritanical ideals which expressed themselves in opposition to secret societies and third party movements, and in a vigorous support of the Temperance Movement.

Through these activities, Hasselquist exerted a great influence on the Swedish immigrants as a group. The farmers were affected by his opposition to the Grangers and the industrial workers by his opposition to Labor Unions. He urged the Swedes to remain agricultural and in an attempt to encourage a movement from the cities to farms, he sponsored the Colony Project at Paxton, Illinois, out of which there grew Augustana College and Theological Seminary. The press and the Church he used to direct incoming immigrants to the already established Swedish settlements. Although his influence was not limited to the Augustana Synod, this Synod is his monument, a united religious body with definitely expressed views on the leading political and social problems of the present day.

EDUCATIONAL CAREER

A.B., Augustana College, 1926

A.M., University of Illinois, 1927

Scholar in History, University of Illinois, 1926-1927

Instructor in History, Trinity Junior College, Round Rock, Texas, 1927-1928

Fellow in History, University of Illinois, 1928-1930

Instructor in Swedish History and Literature, Augustana College, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ARTHUR G ANDERSON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, June 3, 1931, 9 a.m.
Room 212, Commerce Building

Committee in Charge:
- Professor Edward Berman, *Chairman*
- Professor Ernest L. Bogart
- Professor Frederic E. Lee
- Professor Maurice H. Robinson
- Professor Frederic A. Russell
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: Economics (Labor Problems)
Minor Subject: Business Organization and Operation

Thesis: A STUDY OF HUMAN FATIGUE IN INDUSTRY

Summary

The primary objective of this study was to measure the fatigue effect of industrial occupations upon the rates of output during the hours of the day. The study was carried on in a large manufacturing plant employing about twenty-five thousand men and women on a wide variety of factory work. Attention was given to such influencing factors as the physiology of fatigue, hours of work, conditions of work, rest periods, intensity of work, noise, illumination, ventilation, and similar subjects.

In general, the fatigue effect of industrial work as carried on was found not to be a cause for a decline in the rate of production during the latter hours of the morning and afternoon. Good management—economical practices and consideration for human beings as such—is evidently responsible for this work situation. It was found that heavy work is, in general, more economically handled by machine equipment than by men, and that the possible nervous strain incident to some lighter physical tasks, such as operating high speed machines, is relieved in various ways, with the result that neither class of work is unduly fatiguing.

EDUCATIONAL CAREER

B.S., Iowa State College, 1912

M.S., University of Illinois, 1923

Associate, Assistant Professor and Associate Professor in Business Organization and Operation, University of Illinois, 1922-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CLARENCE EDWARD BAKER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 21, 1931, 10 a.m.
Room 218, New Agriculture Building

Committee in Charge:
- Professor Warren A. Ruth, *Chairman*
- Professor Harry W. Anderson
- Professor Ernest E. DeTurk
- Professor Maxwell J. Dorsey
- Professor Charles F. Hottes
- Professor Raymond S. Smith

OUTLINE OF STUDIES

Major Subject: Horticulture (Pomology)
First Minor Subject: Soils
Second Minor Subject: Plant Physiology

Thesis: WATER CONDUCTIVITY IN THE APPLE AS AFFECTED BY PRUNING AND DROUGHT

SUMMARY

Pruning apple trees results in the desiccation of inner wood which concurrently becomes heartwood. This heartwood formation originates at the cut surface and extends downward into the trunk and outward into the newer wood. When pruning wounds are covered immediately with grafting wax, desiccation and heartwood formation do not take place.

Drought-subjected trees have a lower water conductivity than trees supplied with sufficient water. This is due to the deposition of gums in the vessels which renders them useless in water conduction.

Heartwood formation following pruning and during periods of drought is probably not the cause of the death of the trees at Olney.

EDUCATIONAL CAREER

B.S., University of Illinois, 1927

M.S., University of Illinois, 1928

Assistant in Plant Breeding, University of Illinois, 1929-1930

Research Assistant in Horticulture, University of Illinois, 1930-1931

PUBLICATIONS

Some Apple Tree and Soil Moisture Relations, Amer. Soc. Hort. Sci.; Proc. *24*, 245-247. 1927. With W. A. Ruth.

Investigations of Apple Roots at Olney, Illinois, Ill. State Hort. Soc.; Trans. *61*, 418-432. 1927. With W. A. Ruth.

A Comparison of Correlations of Bloom and Yield among Nitrogen-fertilized and Unfertilized Apple Trees, Amer. Soc. Hort. Sci.; Proc. *26*, 197-198. 1929. With W. A. Ruth.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

BURTON NEUBERT BEHLING

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, May 25, 1931, 4 p.m.
Room 215, Commerce Building

Committee in Charge:
- Professor Horace M. Gray, *Chairman*
- Professor James W. Garner
- Professor Merlin H. Hunter
- Professor Maurice H. Robinson
- Dean Charles M. Thompson
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: Economics
First Minor Subject: Public Utilities
Second Minor Subject: Political Science

Thesis: COMPETITION AND MONOPOLY IN PUBLIC UTILITY INDUSTRIES

SUMMARY

Duplication of properties selling in the same market, common in the early period of local public utility operation, has been pronounced uneconomic by experience and by economic theory, which discredits duplication in those enterprises especially subject to the law of decreasing costs. The present century has marked the gradual elimination of competing enterprises and the ascendancy of monopoly subject to legal control. The free operation of competitive forces in a public utility's purchasing activities has been modified, also, by reduction in insecurity of investment due to virtual control of the seller's market, by intercorporate relationships, and by the use of fuel clauses. Regulation by state commission has not been entirely satisfactory in controlling an ever-increasing monopoly power, however, and there is now agitation for public power districts, for easy legal access to municipal competition, and for federal government projects.

The regulating force of indirect competition by substitution also is being urged, but the claim for its efficacy as a method of rate control in the public utility industries has not received substantiation in this study. The power of substitution is active within closer limits of price range in industrial power and heating than in the other classes, because the alternatives are more equivalent, cost and quality of service considered together. But even in this case the relative increase in central station service, a partial differentiation of economic function between the various alternatives, and the expense of conversion from one source of supply to another are obstacles to free competition.

The power of substitution is an upper limit to monopoly price, but in the case of a public utility exempt from the rivalry of an identical service, there is no indication that monopoly pricing policy will realize both maximum profits and maximum use. Since the large users can protect themselves and the small consumers cannot, there is evidence that the latter is discriminated against, rates in practice being determined largely on the competitive basis of what the traffic will bear. Illegitimate use of competitive rate making denotes inadequate regulation, and unless the latter, using careful cost methods, can be vitalized, rate making will continue in the paths which the profit of the public utility prescribes, for it is not in accordance with the prevailing philosophy of business for a monopolist willingly to renounce profits for the benefit of society.

EDUCATIONAL CAREER

B.A., Lawrence College, 1928

A.M., University of Illinois, 1929

Scholar in Economics of Public Utilities, University of Illinois, 1928-1929

Fellow in Economics of Public Utilities, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HENRY WILLIAM BLALOCK

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, May 27, 1931, 3 p.m.
Room 215, Commerce Building

Committee in Charge:
- Professor Nathan A. Weston, *Chairman*
- Professor James W. Garner
- Professor Horace M. Gray
- Professor Merlin H. Hunter
- Professor Frederic E. Lee
- Professor Maurice H. Robinson
- Dean Charles M. Thompson

OUTLINE OF STUDIES

Major Subject: Economics
Minor Subject: Political Science

Thesis: REGULATION THROUGH THE PUBLIC INTEREST DOCTRINE

SUMMARY

The public utility concept probably had its origin in feudalism and the medieval courts. The analogy of the feudal relation suggesting the juristic conception of rights, duties and liabilities arising, not from express undertakings, but as incidents of relation, go far in explaining the legal status of public utilities.

Early English common law divided all business into "public" and "private" categories and assigned peculiar duties to each. But, if one defines business as the vocation of one who undertakes to deal with persons indifferently for profit, it is maintained by students who have studied this early period that all businesses were public at that time. Changing economic conditions increased the number of economic activities serving the public generally which caused them to lose their "public" significance. A few such businesses as the carriers and innkeepers retained their former "public" status through repeated application of the positive duties of public callings.

The difficulty of modern public utility classification lies in the separation of businesses into "public" and "private" categories. "Public" businesses are those "affected with a public interest." In finality the Supreme Court of the United States determines when a business is one legally "affected with a public interest." The tests which the courts and theorists have used are vague and indefinite. The legislatures cannot determine before a court test if a business is one "affected with a public interest." This is true because the legal and economic characteristics which have been attributed to public utilities exist in varying degrees in other businesses. A public utility does not have inherent characteristics and cannot be classified as the botanist classifies his plants.

The writer proposes a pragmatic approach to regulation and public utility determination by eliminating the legal fiction "affected with a public interest" and placing regulation upon a thorough and scientific study of all the conditions surrounding the business. After such a study those businesses might be termed public utilities which are found to be great public necessities and to occupy such a position in relation to public welfare that the desired aims of organized society seeking this public welfare cannot be attained without service and price regulation.

EDUCATIONAL CAREER

A.B., Louisiana State University, 1928

A.M., University of Illinois, 1929

Fellow in Economics of Public Utilities,
University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HORACE HOPKINS BLISS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, May 25, 1931, 3 p.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor G. Frederick Smith, *Chairman*
- Professor Duane T. Englis
- Professor John H. Reedy
- Professor Worth H. Rodebush
- Doctor Leonard L. Steimley

OUTLINE OF STUDIES

Major Subject: Chemistry (Analytical)
First Minor Subject: Physical Chemistry
Second Minor Subject: Mathematics

Thesis: FURTHER APPLICATIONS IN THE USE OF BROMATE IN VOLUMETRIC ANALYSIS

SUMMARY

The extended use of bromate in volumetric analysis has been investigated. The titration conditions using several reductants have been developed to give complete range of temperature from 5 to 100° C., acidity ranges up to 20 per cent HCl, acidity ranges of mixed acids low in halide, and new indicators. Sixteen new internal indicators, chiefly mono-azo and triamino derivatives of triphenylmethane dyestuffs, have been made available to cover the various portions of temperature and acidity ranges and the principal regions of the visible spectrum. The reagent $HgOHBrO_3$ in acid solution has been used to establish quantitative titration methods for arsenite, antimonous and ferrous ions. The bromate titration of tin has also been studied.

The salt $HgOHBrO_3$ has been prepared in a high state of purity suitable for its use as a standard in iodometry and oxidimetry. According to the thermal decomposition reaction:

$$2HgOHBrO_3 = HgO + HgBr_2 + H_2O + 3O_2,$$

pure HgO can be obtained available as a fixed standard in acidimetry and precipitimetry, thus demonstrating the value of mercuric basic bromate as an ultimate and universal standard in volumetric analysis.

EDUCATIONAL CAREER

A.B., University of Michigan, 1925

M.S., University of Michigan, 1926

Instructor, University of New Hampshire, 1926-1928

Assistant in Chemistry, University of Illinois, 1928-1930

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LOUIS HAMILTON BOCK

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, May 27, 1931, 3 p.m.
Room 176, Chemistry Building

Committee in Charge:
Professor Roger Adams, *Chairman*
Professor Vincent duVigneaud
Professor Carl S. Marvel
Professor William C. Rose
Professor Fred W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry
First Minor Subject: Physiological Chemistry
Second Minor Subject: Bacteriology

Thesis: STEREOCHEMISTRY OF CERTAIN DIPHENYL DERIVATIVES AND OF COMPOUNDS CONSISTING OF A BENZENE RING AND A NITROGEN-CONTAINING NUCLEUS OR OF TWO NITROGEN-CONTAINING NUCLEI

SUMMARY

I. 2, 4, 6, 2′, 4′, 6′-Hexanitro-3, 3′-dicarboxydiphenyl was prepared and resolved into optical isomers. The active acid proved to be stable toward racemization.

II. 2, 4, 2′, 4′-Tetramethyl-3, 3′-diquinoyl was prepared. The d-camphorsulfonate, d-bromocamphorsulfonate and d-tartrate were all single substances. Some difference in structure between the benzene ring and the pyridine ring is indicated.

III. N-(2-Carboxyphenyl)-2, 5-dimethyl-3-carboxypyrrol was prepared and resolved into active acids.

IV. N-(3-Carboxyphenyl)-2, 5-dimethyl-3-carboxypyrrol and N-(4-carboxyphenyl)-2, 5-dimethyl-3-carboxypyrrol were prepared. Neither acid could be resolved by the use of brucine or strychnine. The results agree with those to be expected from analagous diphenyl derivatives.

EDUCATIONAL CAREER

B.S., Kansas State Agricultural College, 1928

M.S., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1928-1930

Fellow in Chemistry, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JARVIS BURR BURNER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 28, 1931, 7:30 p.m.
Room 216, Lincoln Hall

Committee in Charge:
- Professor John Van Horne, *Chairman*
- Professor David H. Carnahan
- Professor Arthur Hamilton
- Professor Harry S. V. Jones
- Professor Thomas E. Oliver

OUTLINE OF STUDIES

Major Subject: Romance Languages (Spanish)
First Minor Subject: French
Second Minor Subject: English

Thesis: AN EDITION OF *LA HERMOSURA DE ANGÉLICA* OF FELIX LOPE DE VEGA CARPIO WITH NOTES AND AN INTRODUCTORY ESSAY

Summary

Felix Lope de Vega Carpio, while serving on the Armada in 1588, wrote an epic poem entitled *La hermosura de Angélica*, which he published in 1602. In it he endeavored to write a continuation of the *Orlando Furioso* of Ludovico Ariosto. The poem tells of the adventures of Angélica, Queen of Cathay, while she was securing and attempting to retain the Crown of the Kingdom of Sevilla, then an independent Moorish state.

The history of the romance of chivalry, of which this poem is an example, is long and varied. It began in France with the rise of the two great medieval cycles of romance, the Arthurian and the Carolingian. These two cycles passed into Italy very early, where they were reworked frequently, and where continuations, both in prose and in verse, were common. Boiardo during the last quarter of the 15th century combined the two cycles in the *Orlando Innamorato*. Ariosto published in 1516-32 the *Orlando Furioso* which continued the adventures of various characters to be found in Boiardo's poems.

The poem of Lope de Vega is quite different from the poems of Boiardo and Ariosto. The latter treat of the conflict between Moslem and Christian and the central figures are Charlemagne and Roland. Lope deals with the warfare between Moors, supposedly during the occupation of Spain by the Moors, 711-1492.

The two Italian poems were influenced by the Carolingian and Arthurian cycles of romance and by the classical epic poetry. The poem of Lope, which is much more lyrical than are the poems of Ariosto and Boiardo, in addition to the influences stated above, derived chiefly through the *Orlando Furioso*, shows the influence of the *romance* or ballad literature then so popular in Spain.

EDUCATIONAL CAREER

B.S., University of Illinois, 1924

A.M., University of Illinois, 1928

Assistant in Romance Languages,
University of Illinois, 1928-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CLARENCE EDGAR CARTER

FOR THE

Degree of Doctor of Philosophy

Friday, February 6, 9 a. m.
Room 305, Old Agriculture Building

THE LIBRARY OF THE
JAN 27 1931
UNIVERSITY OF ILLINOIS.

COMMITTEE IN CHARGE:

- PROFESSOR WILLIAM L. BURLISON, Chairman
- PROFESSOR ERNEST E. DETURK
- PROFESSOR GEORGE H. DUNGAN
- PROFESSOR CHARLES F. HOTTES
- PROFESSOR CHARLES L. STEWART
- PROFESSOR CLYDE M. WOODWORTH

OUTLINE OF STUDIES

Major Subject: Agronomy
First Minor Subject: Agricultural Economics
Second Minor Subject: Soils

Thesis: SOME INFLUENCES OF LOW TEMPERATURE ON THE SOYBEAN PLANT

SUMMARY

Studies were conducted to determine some of the influences of various low temperatures for different periods of exposure on soybean plants at several stages of their development.

The varieties used showed considerable variation in their ability to withstand low temperatures. Likewise the individual plants within a variety showed variation in cold resistance.

In the early stages of growth, a temperature of -4.5° C. killed as many plants in 4 hours as in 6 to 8 hours. With temperatures lower than -4.5° C. the length of exposure was a more important factor.

In the rapidly growing stages the number of plants killed increased with the length of exposure to low temperatures.

Exposing soybean plants to temperatures near the freezing point immediately before exposing them to temperatures below freezing did not increase their cold resistance. That is to say, no evidence was found of the so-called hardening effect on the soybean plants studied, such as is so common in certain vegetable crops and in some species of fruit trees.

In a great many cases the average increment in height following exposure was greater in the soybean plants which had been exposed to temperatures below freezing but were not killed, than in the unexposed checks. The exposed plants grew so fast in length that they usually overtook the check plants the sixth week after exposure. This suggests that the low temperature had exerted a stimulative influence upon plant elongation. Further research should be carried out, however, before a definite conclusion to this effect can be drawn.

Although the growth in length of the exposed plants exceeded that of the unexposed checks, the average dry weight per plant was usually less than that of the plants not exposed to the low temperatures.

Soybean plants approaching maturity in the field, when exposed to low temperatures, were lowered in germination roughly proportional to the moisture content of the seed at the time of exposure.

EDUCATIONAL CAREER

B.S., University of Missouri, 1915

County Extension Agent, Obion County, Tennessee, 1917

County Extension Agent, Knox County, Missouri, 1918-1919

Extension Assistant Professor of Field Crops, University of Missouri, 1920-1923

Extension Associate Professor of Field Crops, University of Missouri, 1923-1930

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CHING-HSIEN LI

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, June 2, 1931, 4 p.m.
Room 202, Physics Building

Committee in Charge:
- Professor Elmer H. Williams, *Chairman*
- Professor Robert D. Carmichael
- Professor Jakob Kunz
- Professor Francis W. Loomis
- Professor Floyd R. Watson

OUTLINE OF STUDIES

Major Subject: Physics
Minor Subject: Mathematics

Thesis: MAGNETIC PROPERTIES OF MAGNETITE CRYSTALS AT LOW TEMPERATURE

Summary

Thin circular plates cut parallel to the 100, 110, and 111 planes of the magnetite crystal were prepared. Both the perpendicular and the parallel components of magnetization at low temperatures down to that of liquid air were investigated by the method of torsion. It was found that the magnetic property of the crystal was abruptly changed at about −160 degrees centigrade. It seems that the elementary magnetic elements within the crystal are very easily rotated in the magnetic field at that temperature. This temperature corresponds exactly to the temperature at which the heat capacity of magnetite is suddenly increased to a maximum point as was found experimentally by R. W. Millar two years ago.

It has been found by P. Weiss that at the Curie point the disappearance of ferromagnetism is connected with a change of specific heat. The relation found by Weiss cannot be applied to the phenomenon found at low temperature. The effect observed represents therefore a different magneto-caloric phenomenon, due presumably to a change of crystalline state.

EDUCATIONAL CAREER

B.S., Soochow University, 1925
M.S., University of Illinois, 1929

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

FRANCIS WEST COOKE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, June 1, 1931, 4 p.m.
Room 202, Physics Building

Committee in Charge:
- Professor Jakob Kunz, *Chairman*
- Professor Robert D. Carmichael
- Professor Charles T. Knipp
- Professor Francis W. Loomis
- Doctor William H. Sanders

OUTLINE OF STUDIES

Major Subject: Physics
First Minor Subject: Theoretical Physics
Second Minor Subject: Mathematics

Thesis: IONIZATION OF CAESIUM VAPOR BY LIGHT

SUMMARY

The ionization of caesium vapor at very low pressures has been observed throughout the region of continuous absorption, with the continuous spectrum of hydrogen as a source of light. Because of the low pressures used very little or no ionization was observed for light of wavelength greater than that of the series limit. The absolute value of the atomic absorption coefficient is in fair agreement with the published value of Mohler, and in complete disagreement with that of Little. The accuracy is limited by the dark current being relatively large, due to the small light intensity and low caesium pressure. The curve for the relation between ionization and wavelength of the light agrees with the curve of Little and with that of Mohler, and differs from that of Lawrence in that it shows an increase at short wavelengths.

EDUCATIONAL CAREER

A.B., College of William and Mary, 1915

M.S., North Carolina State College, 1923

A.M., University of Illinois, 1925

Assistant in Physics, University of Illinois, 1923-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DONALD WALKER DAVIS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 29, 1931, 3 p.m.
Room 176, Chemistry Building

Committee in Charge:

- Professor Carl S. Marvel, *Chairman*
- Professor Reynold C. Fuson
- Professor Donald B. Keyes
- Professor Charles T. Knipp
- Professor Worth H. Rodebush

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: THE INFLUENCE OF MOLECULAR WEIGHT ON THE DISSOCIATION OF HEXA-ACETYLENIC ETHANES

Summary

1. A satisfactory synthesis of hexa-(3-ethyl-3-methyl pentinyl-1) ethane has been developed.

2. This hexa-substituted ethane has been shown to be less stable than hexatertiarybutylethinylethane

    a. by its greater ease of cleavage with sodium amalgam,
    b. by its greater ease of thermal rearrangement, and
    c. by its sensitivity to oxygen.

3. Increased molecular weight of the alkyl group in the series of hexatertiaryalkylethinylethanes has been shown to decrease the stability of the ethane carbon linkage.

EDUCATIONAL CAREER

B.A., Lawrence College, 1927

Assistant in Chemistry, University of Illinois, 1927-1929

Fellow in Chemistry, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

FLORENCE LYDIA EVANS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, May 19, 1931, 2 p.m.
Room 366, Chemistry Building

Committee in Charge:
  Professor Fred W. Tanner, *Chairman*
  Professor Charles F. Hottes
  Professor Martin J. Prucha
  Professor William C. Rose
  Doctor George I. Wallace

OUTLINE OF STUDIES

Major Subject: Bacteriology
First Minor Subject: Dairy Bacteriology
Second Minor Subject: Physiological Chemistry

Thesis: THE EFFECT OF SODIUM CHLORIDE, SODIUM NITRATE AND SODIUM NITRITE ON CLOSTRIDIUM BOTULINUM, CLOSTRIDIUM SPOROGENES, AND CLOSTRIDIUM PUTRIFICUM

Summary

1. The concentration of sodium chloride necessary to inhibit growth of anaerobic spore formers, of the genus Clostridium, varies with the medium on which they are cultured.

2. The limit of tolerance exhibited by the strains used was between ten and eleven per cent of sodium chloride.

3. Sodium nitrate is not effective in preventing the growth of these organisms, or toxin formation by *Clostridium botulinum* in concentrations which are practical in the curing of meat.

4. Sodium nitrite in concentrations up to 0.5 per cent cannot be relied upon to prevent the growth of putrefactive anaerobes, or toxin formation by *Clostridium botulinum.*

5. Analysis of the substrate should be used as a basis of determining the concentration of sodium chloride, sodium nitrate or sodium nitrite when these are added to the substrate before sterilization.

6. Variations in the resistance of individual strains to these three salts were observed.

7. The efficiency of curing mixtures depends primarily on the sodium chloride concentration.

8. Curing mixtures which add 3.5 per cent of sodium chloride, one per cent of sucrose and varying quantities of sodium nitrate to meat do not prevent spoilage of the meat whether it is cooked or uncooked

9. Curing mixtures which add the same amounts of sodium chloride and sugar together with varying quantities of sodium nitrite, do not prevent spoilage of uncooked meat. With cooked meat, spoilage is not so great with the higher quantities, but it is not entirely prevented.

EDUCATIONAL CAREER

B.A., University of South Dakota, 1928

A.M., University of Illinois, 1929

Scholar in Bacteriology, University of Illinois, 1928-1929

Fellow in Bacteriology, University of Illinois, 1929-1930

Assistant in Bacteriology, University of Illinois, Summer 1930

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

BYRON HALL GIBSON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, June 1, 1931, 2 p.m.
Room 108, Administration Building

Committee in Charge:
- Professor Walter Graham, *Chairman*
- Professor Edward C. Baldwin
- Professor David H. Carnahan
- Professor George T. Flom
- Professor Harry S. V. Jones
- Professor Arthur W. Secord

OUTLINE OF STUDIES

Major Subject: English
First Minor Subject: English Philology
Second Minor Subject: French

Thesis: THE HISTORY, FROM 1800 TO 1832, OF ENGLISH CRITICISM OF PROSE FICTION

SUMMARY

Many of the critics who were active during the period from 1800 to 1832 regarded the novel as an ephemeral type, facile, and hence unworthy of extended critical inquiry. Others mentioned individual prose fictions with praise, but were too preoccupied with poetry and with the drama to accord the new prose genre more than passing notice. Yet there remained a considerable number who realized that interpretative and directing force must be brought to bear upon the form which had come to be at once so promising a vehicle of literary genius and so powerful an influence over the popular mind and morals. The critical and biographical studies, the novels, the periodicals, the letters and diaries, and the miscellaneous works published during this period consequently discover a substantial corpus of novelistic criticism.

During the first fourteen years of the century, the general character of English criticism of prose fiction underwent no decided change. The dominant trend was that which favored a probable, strictly moral representation of every-day life.

The publication of Sir Walter Scott's *Waverley* (1814) and of John Colin Dunlop's *History of Fiction* (1814) marks an epochal advance, both in the creation and in the interpretation of prose fiction.

Waverley and the family of novels which it introduced, the exemplars of a new and better historical romance, were particularly influential. It was largely due to them that the novel became, in the view of many critics, a great literary genre. Comments upon the excellencies and the defects of the individual "Waverley" novels, and upon the new-old question of the proper relations of history to fiction, accordingly, form the most conspicuous part of novelistic criticism throughout the years from 1814 to 1832.

Yet, to the very end of the period, no critic arose to write the esthetics of the historical novel, to expose the truth regarding its peculiar character, its proper function, and its permanent value. Although criticism of the novel had progressed rapidly during the first three decades of the nineteenth century, therefore, novelistic theory had not yet come abreast of practice.

EDUCATIONAL CAREER

A.B., Birmingham-Southern College, 1928

A.M., University of Illinois, 1929

Scholar in English, University of Illinois, 1928-1929

Fellow in English, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

SIDNEY ERWIN GLENN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, June 2, 1931, 3 p.m.
Room 108, Administration Building

Committee in Charge:
- Professor Walter Graham, *Chairman*
- Professor Thomas W. Baldwin
- Professor David H. Carnahan
- Professor George T. Flom
- Professor Harry S. V. Jones
- Professor Arthur W. Secord

OUTLINE OF STUDIES

Major Subject: English
First Minor Subject: English Philology
Second Minor Subject: French

Thesis: SOME FRENCH INFLUENCES ON HENRY FIELDING

SUMMARY

Fielding's comedies, burlesques, and farces written prior to 1731 were influenced by the works of Molière, and Regnard, and by the *Théâtre Italien*, and display a definite awareness of French classicism, although they were also greatly influenced by the English theatre of the Restoration. From 1731 to 1737, Fielding constantly adapted and Anglicized French material, translated Molière, and expressed a sincere and deep admiration for that author. Molière influenced his subject matter and his manner, and gave him a greater seriousness of purpose. In the third period, which ends with the publication of *Joseph Andrews*, appear traces of his contacts with French literature, particularly the obvious influence of the spell of Montaigne, but very little direct borrowing. Throughout these periods, Fielding displays a sound knowledge of French, a fair acquaintance with French literature of the Louis XIV period, and an awareness of the work of French writers in every field in which he happened to be interested. Nevertheless, the theories advanced by various critics that he regularly imitated French writers must be set aside, because they do not take into account the close relationship between French and English literature in the early eighteenth century, or the direct influence of Cervantes, who had influenced also much of the French literature which Fielding's work most closely resembles. Fielding took from France the general and the universal rather than the particular and the local. He made this so completely his own that his work remains as English as Chaucer's, if less insular than Richardson's.

EDUCATIONAL CAREER

A.B., University of Illinois, 1922

A.M., University of Illinois, 1923

Assistant and Instructor in English,
University of Illinois, 1922-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

MARCUS SELDEN GOLDMAN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, June 3, 1931, 9 a.m.
Room 108, Administration Building

Committee in Charge:
- Professor Walter Graham, *Chairman*
- Professor Edward C. Baldwin
- Professor David H. Carnahan
- Professor George T. Flom
- Professor Harold N. Hillebrand
- Professor John J. Parry
- Professor Arthur W. Secord

Outline of Studies

Major Subject: English
First Minor Subject: English Philology
Second Minor Subject: French

Thesis: SIR PHILIP SIDNEY AND THE ARCADIA

Summary

Sir Philip Sidney (1554-1586) is a figure of great importance for the study of the English Renaissance. He was equally distinguished as a courtier, statesman, soldier, and man of letters; yet despite the variety of his interests and activities, his life and writings present a remarkable unity. In any study of Sidney, his famous romance, the *Arcadia*, must have a central place.

Sidney belonged to the new ruling class of Tudor England and possessed its restless and ambitious spirit. In early life he came under the influence of Hubert Languet, a disciple of Melanchton, who not only stimulated his interest in humanistic studies but encouraged in him the desire to play an important part in public affairs.

Fulke Greville, Sidney's close friend and first biographer, has clearly indicated that the *Arcadia*, far from being a pastoral belonging to the literature of escape, is really an heroic poem with a firm didactic purpose. Greville's view though long rejected and still largely ignored is essentially right. It is amply supported by Sidney's own discussion of the nature and purposes of poetry in the *Defense*, and is confirmed by examination of the *Arcadia* itself.

For much of the material of his romance Sidney drew upon the contemporary scene and repeatedly presented the thorough glorification of action in incidents and character, ideas which he felt to be of value for the guidance of Englishmen of his own day.

The elements in the *Arcadia* which derive from earlier literature are a further proof of Sidney's preference for strenuous themes and a chivalric point of view. To the sources previously recognized by scholars should now be added the Arthurian cycle of romance as epitomized in the Morte d'Arthur of Sir Thomas Malory.

Heroic virtue was the ideal which Sidney sought to follow in life and which he taught in the *Arcadia*. The romance presents throughout a steady insistence upon man's independence of chance, and his obligation to act with all the vigor of his spirit. It reflects in its dominant theme of heroic action both the philosophy and the practice of Sidney's life.

EDUCATIONAL CAREER

A.B., Miami University, 1916

A.M., University of Illinois, 1917

A.M., Harvard University, 1926

Scholar in English, University of Illinois, 1916-1917

Member of U. S. Army Detachment at the Sorbonne, March-July, 1919

Assistant to Professor Henri Lemmonier for his course in the History of French Art at the Sorbonne, April-July, 1919

Fellow in English Philology at the Sorbonne under the Society for American Fellowships in French Universities and its successor, the American Field Service Fellowships, Inc., 1919-1921

Classical Master, the Hoosac School, Hoosick, N. Y., 1923-1924

Graduate student in English, Harvard University, 1924-1926

Assistant in English, University of Illinois, 1926-1929

Instructor in English, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN BEN GOODMAN

FOR THE

Degree of Doctor of Philosophy

Thursday, January 29, 1931, 3 p. m.
Room 176 Chemistry Building

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UNIVERSITY OF ILLINOIS.

Committee in Charge:

- Professor Norman W. Krase, Chairman
- Professor George L. Clark
- Professor John A. Goff
- Professor Donald B. Keyes
- Professor Worth H. Rodebush

OUTLINE OF STUDIES

Major Subject: Chemistry (Industrial)
First Minor Subject: Physical Chemistry
Second Minor Subject: Mechanical Engineering

Thesis: SOLUBILITY RELATIONS AT HIGH PRESSURES AND TEMPERATURES

SUMMARY

A high pressure gas solubility apparatus has been developed which is suitable for the determination of gas solubilities at ordinary and elevated temperatures, and at pressures from one hundred to one thousand atmospheres. Certain recent developments in solubility technique are presented, which are improvements over previous methods.

The solubility of nitrogen in water has been measured at temperatures from 0° Centigrade to 170° Centigrade and at pressures of one hundred, one hundred and twenty-five, two hundred, and three hundred atmospheres.

The coefficient in Henry's law has been calculated for the several pressures and solubility theories tested with the aid of the new data.

EDUCATIONAL CAREER

B.S., University of Denver, 1927

M.S., University of Denver, 1928

Assistant in Chemistry, University of Illinois, 1928-1931

PUBLICATIONS

with R. C. Gustavson—

Solubility of Non-irradiated Cholesterol in Liquid Ammonia.
J. Am. Chem. Soc., *49,* 2526 (1927)

with N. W. Krase—

Behavior of CO_2 under Pressure.
Chem. and Met. Eng., *36,* 3 (1929)

Vapor Pressure of Toluene up to the Critical Temperature.
Ind. and Eng. Chem., *22,* 13 (1930)

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JUDSON ROY GRIFFIN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 21, 1931, 2 p.m.
Room 134, Natural History Building

Committee in Charge:
- Professor Thomas E. Savage, *Chairman*
- Professor William S. Bayley
- Professor William O. Blanchard
- Professor George L. Clark
- Professor Waldorf V. Howard
- Professor Francis P. Shepard

OUTLINE OF STUDIES

Major Subject: Geology
Minor Subject: Chemistry

Thesis: THE FAUNA OF THE LA SALLE LIMESTONE

Summary

A complete study of the La Salle limestone was undertaken in this investigation. From the earliest days, as far back as 1836, this limestone has been a noted collecting ground for paleontologists. None had studied the fauna as a whole, but were content to describe the new species found in it. The present study was undertaken to make a complete record of the life found in the limestone in order that it might serve as a means of correlating this with other limestones in other regions and to give some idea as to its vertical position in the geologic column.

As a result of the study the following facts were established:

That the species Tegulifera armata developed from the species Marginifera wabashensis;

That the vertical range of Chonetes mesolobus has been considerably extended upward to include the La Salle limestone;

Temnocheilus wagneri is here described for the first time;

That the La Salle limestone is the type locality for 25 species of invertebrates;

That 10 species here before held to be synonymous with other species were brought back into the literature again as separate species;

That Cyaxthonia distortum is not a Cyaxthonia as has been described but is a Lophyphyllum;

That the presence of Schistoceras missouriensis indicates a correlation with the Cisco formation of Texas, as the species is restricted to this formation in that region.

That the faunal assemblage corresponds to that of the Kansas City formation of Kansas.

EDUCATIONAL CAREER

A.B., University of Illinois, 1925

A.M., University of Illinois, 1927

Assistant in Geology, University of Illinois, 1927-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RICHARD ELLIS HASWELL

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 28, 1931, 4 p.m.
Room 108, Administration Building

Committee in Charge:
- Professor Thomas W. Baldwin, *Chairman*
- Professor George T. Flom
- Professor Walter Graham
- Professor Harold N. Hillebrand
- Professor Thomas E. Oliver
- Professor Arthur W. Secord

OUTLINE OF STUDIES

Major Subject: English
First Minor Subject: English Philology
Second Minor Subject: French

Thesis: THE HEROIC COUPLET BEFORE DRYDEN (1550-1675)

Summary

This dissertation is a survey of the poetry written in England in the heroic couplet between the years 1550 and 1675. It traces the spread of the form from one kind of poetry to another, the changes that took place in the structure of the couplet as it was used by various poets, and the correspondences between the history of this one form and the history of literature in general.

A continuous and steady growth in usage is traced, beginning with the very slight use in *Tottel's Miscellany* and ending with the extensive, almost exclusive, use by Dryden and his contemporaries. By 1600 the heroic couplet had been employed for all kinds of poetry—narrative, translation, satire, religious verse, and occasional verse—for which it was later employed. During the rest of the period, other forms were gradually excluded from those types.

The structure of the couplet also went through a continuous evolution. Before 1590 it was a rigid, closed form. During the following twenty years, notably in the hands of Drayton, Marlowe, Jonson, and Donne, it developed a flexible, adaptable, but still compact and unified structure. Then followed a period of disintegration, when the couplet fell to pieces, losing all stability and consistency. Out of this chaos three definite varieties appeared, all with their beginnings in the Elizabethan couplet: Waller's smooth and graceful couplet, Cowley's rough and awkward, but powerful couplet, and Cleveland's sharp, ungraceful couplet. These three were merged by Dryden.

This history obviously corresponds to the history of English literature in general: a period of probation and discipline followed by high achievement; then chaotic disintegration, out of which emerged new standards and critical concepts, and a new orientation of literature.

EDUCATIONAL CAREER

A.B., University of Illinois, 1926

A.M., University of Illinois, 1928

Assistant in English, University of Illinois, 1926-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EINAR INGVALD HAUGEN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, May 27, 1931, 4 p.m.
Room 108, Administration Building

Committee in Charge:
- Professor George T. Flom, *Chairman*
- Professor Claude L. Finney
- Professor Harris F. Fletcher
- Professor Walter Graham
- Professor Harold N. Hillebrand
- Professor Harry S. V. Jones

OUTLINE OF STUDIES

Major Subject: Scandinavian
First Minor Subject: Old English
Second Minor Subject: English Literature

Thesis: THE ORIGIN AND EARLY HISTORY OF THE NEW NORSE MOVEMENT IN NORWAY

SUMMARY

The thesis is an investigation into the early phases of the New Norse language movement; it analyzes in detail the theories and practice of Ivar Aasen, the creator of New Norse. It also views the language revival in its relation to the national and popular renaissance which followed the separation of Norway from Denmark in 1814. A particular inquiry has been made into the origins of the movement, its backgrounds and underlying motives. To this end the life and works of Aasen have been investigated to determine the ideals which dominated him and the forces by which he was influenced, his development and growth, and the significance of his linguistic and literary work for the movement which he originated. This movement is of prime importance for the study of modern Norwegian cultural life, but it is also of general interest for the parallel it offers with similar nationalistic movements in other European countries, notably the Greek and Gaelic revivals. By extensive references and bibliographies, the ground is cleared for a comprehensive study of the movement, such as has not yet been written.

EDUCATIONAL CAREER

B.A., St. Olaf College, 1928

A.M., University of Illinois, 1929

Scholar in English, University of Illinois, 1928-1929

Fellow in English, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

SISTER MARY LOYOLA HAYDE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, May 25, 1931, 4 p.m.
Room 108, Administration Building

Committee in Charge:
- Professor Thomas W. Baldwin, *Chairman*
- Professor Edward C. Baldwin
- Professor Walter Graham
- Professor Harold N. Hillebrand
- Professor Harry S. V. Jones
- Professor William A. Oldfather

OUTLINE OF STUDIES

Major Subject: English Literature
First Minor Subject: English Language
Second Minor Subject: Latin

Thesis: THE SOURCE OF THE LATIN TROPE

Summary

The object of this study is two-fold: (1) to examine the present theory of trope origin and to point out by internal and external evidence that troping is earlier than St. Gall; and (2) to present with evidence a new theory, (a) of the immediate source of the trope in a particular Latin mediaeval liturgy suppressed in the twelfth century; and (b) of the probability of an ultimate source in the Greek liturgy of the primitive Church.

This study contributes to the history of English dramatic origins. Since the trope is conceded to be the liturgical source of modern European drama, a study of the source of the trope is in reality an attempt at reaching an ultimate source of that drama. My purpose is more particularly to point out to students of dramatic origins that the roots of drama penetrated much farther into the past, and were spread over a much broader area than the generally accepted theory of trope origin would lead one to believe.

EDUCATIONAL CAREER

Ph.B., University of Chicago, 1915

A.M., University of Chicago, 1917

Graduate work at the University of Chicago—ten quarters; at the Catholic University of America, Washington, D.C., 1920-1921; at the University of Illinois, 1926-1927, and the Summer Sessions of 1925, 1929, and 1930

Instructor in English, St. Xavier College, Chicago, 1917-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

FRANCES KELLAM HENDRICKS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, June 1, 1931, 9 a.m.
Room 424A, Library Building

Committee in Charge:
- Professor William S. Robertson, *Chairman*
- Professor Frederick C. Dietz
- Professor Matthew T. McClure
- Professor Theodore C. Pease
- Professor Frederick S. Rodkey

OUTLINE OF STUDIES

Major Subject: History

First Minor Subject: Latin-American History

Second Minor Subject: Philosophy

Thesis: CHURCH AND STATE IN CHILE BEFORE 1891

Summary

Upon gaining their independence, the new republics in Spanish America assumed the ecclesiastical powers Spain had formerly exercised. The action involved them in controversies with the Roman Catholic church over the patronage (having as its main feature the right of presentation for an ecclesiastical benefice) and related rights. Since early Middle Ages Spain claimed and at times exercised the patronage. The church held that it originated in papal concession and that it was subject to church law. The Spanish kings recognized papal concession as a factor, but furthermore claimed the right as an ancestral heritage, on account of services rendered to the church, and by virtue of their sovereignty. Their policy growing out of the right of the real patronage of the Indies included the zealous protection of their prerogatives and the development of an extensive and complex technique of administration.

The independent government of Chile accorded the church a special position but held that the patronage was inherent in sovereignty. Until independence was well-established, the papacy refused to treat with the rebelling colonies. But the leaders of Chile dealt with ecclesiastical problems according to their judgment and ability. They made regulations concerning vacant benefices, the regular orders, the income and wealth of the church, the educational system, cemeteries, and other matters. Overtures to Rome in 1822 resulted in a non-diplomatic mission to Chile. It failed to solve the chief problems; the apostolic delegate thought the claims of the state too extensive and its actions an invasion of the ecclesiastical sphere.

In 1830 the liberals gave way to a conservative régime. The new government agreed with the church on many points, but mantained strongly the state's claim to the patronage. The papacy denied that the right belonged to the state but regularly instituted the government's nominees in episcopal sees. Efforts were made to adjust the differences, but in a series of negotiations from 1845 to 1860, Chile and the papacy failed to make an agreement.

The liberals regained political control in 1860. They encountered stubborn resistance to the part of their program dealing with the church and until about 1880 achieved but limited success. A crisis developed over the appointment of an archbishop. An apostolic delegate failed to solve the problem and a break with Rome followed. The break prepared the way for the enactment of several reform laws affecting the church. Throughout the struggle for reform it became increasingly evident that the solution of the patronage problem depended upon the separation of church and state. The separation was affected in the constitution of 1925 through special arrangements with the church.

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EDUCATIONAL CAREER

A.B., University of Texas, 1922

A.M., University of Texas, 1925

Tutor in Philosophy, University of Texas, 1922-1923

Assistant Professor of History, Stephen F. Austin State Teachers College, March, 1927-September, 1928

Assistant in History, University of Illinois, 1928-February, 1930

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LOWELL FREDERICK HUELSTER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Saturday, May 23, 1931, 9 a.m.
Room 215, Commerce Building

Committee in Charge:

- Professor Horace M. Gray, *Chairman*
- Professor James W. Garner
- Professor Merlin H. Hunter
- Professor Maurice H. Robinson
- Dean Charles M. Thompson
- Professor Nathan A. Weston
- Professor Ivan Wright

OUTLINE OF STUDIES

Major Subject: Economics
First Minor Subject: Public Utilities
Second Minor Subject: Political Science

Thesis: THE DEVELOPMENT OF THE NATURAL GAS INDUSTRY AS A PUBLIC UTILITY

SUMMARY

As a result of the developments in the natural gas industry within the past few years, this study has been undertaken, first, to afford a comprehensive survey of the nature, extent, economic organization and problems of this industry, particularly of the public utility branch; and secondly, to investigate the status of this industry as a public utility and some of the regulatory problems connected with it.

Following a brief history of the industry, a statistical account, based upon government figures, of its growth is presented. The hazards of the industry in connection with the production and transportation of gas are pointed out. These are particularly due to the fugacious nature of gas and its close association with petroleum. Chapter three considers the economic organization of the industry and the fact that nearly eighty percent of the public utility distribution of natural gas is handled by a single interrelated group of companies primarily interested in the electric power business.

An investigation of the public utility status of the industry brings out the fact that the distribution and transportation of natural gas is considered to be a quasi-public service in most states, while the production of gas, as such, is generally held to be a private business. However, production by a natural gas transmission or distribution company is in most states a public utility service. It seems probable that, in view of the public interest in natural gas production, that service should be classified as a public utility. The foremost problem of this industry is found in the need of conserving natural gas. There is an indication that, as a result of this problem, utility commissions are extending their regulatory activities into the field of gas conservation. Likewise, the right to discriminate against large users of gas is another distinguishing feature of the natural gas utility. Finally, a consideration of the subject of natural gas in interstate commerce brings out the fact that approximately seventeen percent of the total utilized production or thirty-five percent of the public utility distribution of natural gas crosses state boundaries. Such gas is, for the most part, not subject to state regulation. Thus it is probable that Federal regulation alone will be able to prevent the accumulation of excessive profits by interstate gas carriers.

EDUCATIONAL CAREER

A.B., Lawrence College, 1926

A.M., University of Illinois, 1927

Scholar in Economics of Public Utilities, University of Illinois, 1926-1927

Fellow in Economics of Public Utilities, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

GORDON HUGHES

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, May 26, 1931, 3 p.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor B. Smith Hopkins, *Chairman*
- Professor Reynold C. Fuson
- Professor Charles T. Knipp
- Professor John H. Reedy
- Professor Ralph L. Shriner

OUTLINE OF STUDIES

Major Subject: Chemistry (Inorganic)
First Minor Subject: Organic Chemistry
Second Minor Subject: Physics

Thesis: OBSERVATIONS ON THE RARE EARTHS; STUDIES ON ANHYDROUS YTTRIUM SALTS; STUDIES ON AN ELECTROLYTIC SEPARATION OF THE RARE EARTHS

SUMMARY

1. Anhydrous yttrium iodide, thiocyanate, and nitrate have been prepared in an impure state. Anhydrous yttrium bromide has been prepared pure.

2. Attempts were made to deposit yttrium electrolytically from nonaqueous solutions of the above salts, but no metallic deposits were formed.

3. Dilute yttrium amalgams were prepared by the electrolysis of anhydrous yttrium bromide in absolute ethyl alcohol using a mercury cathode.

4. The melting point of anhydrous yttrium bromide was found to be above 1000° C.

5. Electrolyses of rare earth acetate solutions were found to precipitate the simple rare earth carbonate, only in the presence of the nitrate ion.

6. A distinct change in the order of separation was noted when the electrolyses were carried out in the presence of sodium and potassium ions.

7. Attempts were made to measure the solubility of pure lanthanum carbonate gravimetrically, but were unsuccessful.

8. It was found impossible to measure the P_H of precipitation of the rare earth carbonates during electrolysis.

EDUCATIONAL CAREER

A.B., Oberlin College, 1928

A.M., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1929-1930

Research Assistant in Chemistry, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CLARENCE ALBERT JOHNSON

FOR THE

Degree of Doctor of Philosophy

Wednesday, March 18, 1931, 2:30 p. m.
Room 305 Research Building

COMMITTEE IN CHARGE:

- PROFESSOR WILLIAM H. WELKER, Chairman
- PROFESSOR OLAF BERGEIM
- DEAN DAVID J. DAVIS
- PROFESSOR HUGH A. McGUIGAN
- PROFESSOR CHARLES S. WILLIAMSON

OUTLINE OF STUDIES

Major Subject: Physiological Chemistry
Minor Subject: Bacteriology

Thesis: A STUDY OF THE PROTEINS OF RAGWEED POLLENS

SUMMARY

The active water soluble proteins of giant (Ambrosia trifida) and common (Ambrosia elatior) ragweed pollens were separated into three fractions by precipitation at various concentrations of ammonium sulphate. In a preliminary study it was observed that patients with autumnal hay fever residing in this vicinity did not react alike to these fractions when tested by the scratch method.

Under proper conditions rabbits respond to injections of ragweed pollen proteins with the production of precipitins. The antisera were shown to react with the antigens in concentrations of one part of the latter in 100,000 parts of saline.

The proteins of giant and common ragweed pollens, as well as those of rough marsh elder (Iva xanthifolia), Southern ragweed (Ambrosia bidentata), cocklebur (Xanthium canadense), slender ragweed (Franseria tenuifolia), Western ragweed (Ambrosia psylostachya), and bur ragweed (Franseria acanthicarpa) pollen are antigenically related as shown by the precipitin test.

All protein fractions used as antigens were shown to give skin reactions when tested on sensitive individuals. From this evidence it would appear that the active principle of ragweed pollen is of protein nature or that it clings to a protein moiety. Conclusions drawn from data obtained by animal experimentation, while they may be significant, may not necessarily be applicable to the symptom-complex of hay fever in man.

The minor fractions of ragweed pollen (of non-protein nature), i.e., lipoids, carbohydrates, and the crude insoluble fiber are clinically, relatively inert.

EDUCATIONAL CAREER

S.B., The University of Chicago, 1925

S.M., The University of Chicago, 1927

Assistant in Physiological Chemistry, University of Illinois, 1926-27.

Lilly Research Fellow in the Department of Physiology and Physiological Chemistry, University of Illinois, 1927-

PUBLICATIONS

The Biuret Reaction of Acid Imides of the Barituric Acid Type (with M. M. Rising). J. Biol. Chem., 1928, 80, 709.

Symptoms Resembling Epilepsy Following Experimental Lesions in the Brain of the Dog (with L. O. Morgan). Proc. Exp. Biol. and Med., 1928, 25, 442.

The Fractionation of Pollen Proteins and Their Skin Reactions on Sensitive Individuals (with B. Z. Rappaport). Proc. Soc. Exp. Biol. and Med., 1929, 26, 771.

Experimental Lesions in the Tuber Cinereum of the Dog (with L. O. Morgan). Arch. Neurol. and Psychiat., 1930, 24, 696.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EARL HANFORD JOHNSON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, May 26, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor Roger Adams, *Chairman*
- Professor George L. Clark
- Professor Charles T. Knipp
- Professor Worth H. Rodebush
- Professor Ralph L. Shriner

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: SOME DERIVATIVES OF α NAPHTHOYL-O-BENZOIC ACID; AND A STUDY OF THE SYNTHESIS OF PERYLENE

SUMMARY

A study of α naphthoyl-o-benzoic acid has been made with the object of preparing substituted α naphthoyl-o-benzoic acids of known structure in order to obtain from them by dehydration new 1, 2-benzanthraquinones of known constitution. It has been shown that when α naphthoyl-o-benzoic acid is substituted, the first substituent enters the bz 4 position and the second the bz 1 position. These compounds were then converted to the corresponding 1, 2-benzanthraquinones.

Bz-4-bromo α naphthoyl-o-benzoic acid, bz-4-bromo 1, 2-benzanthraquinone, bz-4, 1-dibromo α naphthoyl-o-benzoic acid bz-4, 1-dibromo 1, 2-benzanthraquinone, bz-4, 1——tetrabromo α naphthoyl-o-benzoic acid, bz-4-bromo-bz-1-nitro α naphthoyl-o-benzoic acid, and bz-4, 1-dinitro α naphthoyl-o-benzoic acid have been synthesized.

A study has been made of the synthesis of perylene from di-B-naphthol. This is an easily prepared raw material which might serve as a basis for the preparation of perylene, one of the important materials from which important vat dyes are derived.

Di-B-naphthol has been distilled with antimony trichloride and zinc dust, with aluminum chloride and zinc dust, and with zinc chloride and zinc dust. The thionyl ester of di-B-naphthol has been distilled with zinc chloride and zinc dust. The pyridine salt of di-B-naphthol has been distilled with zinc chloride and zinc dust, and with aluminum chloride and zinc dust. A small yield of perylene was obtained in most of these reactions.

EDUCATIONAL CAREER

A.B., Lawrence College, 1926

A.M., University of Illinois, 1928

Assistant in Chemistry, University of Illinois, 1926-1931

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UNIVERSITY OF ILLINOIS
THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

PAUL EVANS JOHNSTON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 29, 1931, 3 p.m.
Room 215, Commerce Building

Committee in Charge:
- Professor Charles L. Stewart, *Chairman*
- Professor Ernest L. Bogart
- Professor Harold C. M. Case
- Professor Merlin H. Hunter
- Professor Laurence J. Norton
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: Economics

First Minor Subject: Farm Organization and Management

Second Minor Subject: Statistics

Thesis: FACTORS INFLUENCING FARM EARNINGS ON 380 CENTRAL ILLINOIS FARMS, 1929

SUMMARY

A wide variation in earnings was found on a group of 380 farms located in central Illinois. The data were for the year 1929 and were secured from farmers living in Livingston, McLean, Tazewell, and Woodford Counties. This wide variation in earnings persisted even though the records were grouped on the basis of the type of farming and on uniform soil types. Suitable measures were selected or developed to represent the efficiency of various important phases of the farms studied. By means of the method of graphical curvilinear correlation it was possible to evaluate the relative importance of the various factors which were responsible for the variation in farm earnings. The major portion of the variations in earnings was caused by variations of such items as crop yields, livestock efficiency, man labor, power and machinery, and general farm expenses. The method of analysis used made it possible to show the approximate net effect of each independent variable on farm earnings.

Limestone and clovers were responsible for more of the increase in crop yields than any of the other soil-building practices. Seed selection, storage, and treatment were found to be of considerable importance since they were phases of management over which tenant farmers had as much control as owner operators.

Early farrowed pigs when raised on rotated pastures were found to pay best for the feed consumed. The most efficient poultry producers hatched their chicks early, fed them a balanced ration, raised them on new lots, and secured egg production in the fall months when prices were the highest.

Although records for only one year were used, they demonstrated certain fundamental principles of good farm management believed to be applicable at that time in the case of many other farms located on the prairie soils of Illinois, and in a measure not markedly different in other periods as well.

EDUCATIONAL CAREER

B.S., University of Illinois, 1917

M.S., University of Illinois, 1926

Assistant and Assistant Professor in Farm Organization and Management, University of Illinois, 1925-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WILLIAM GARFIELD KAMMLADE

FOR THE

Degree of Doctor of Philosophy

Monday, January 26, 1931, 4 p. m.
Room 331 New Agriculture Building

THE LIBRARY OF THE
JAN 27 1931
UNIVERSITY OF ILLINOIS

Committee in Charge:

- Professor Henry P. Rusk, Chairman
- Professor William L. Burlison
- Professor Robert Graham
- Professor Harold H. Mitchell
- Dean Herbert W. Mumford
- Professor Elmer Roberts
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: Animal Husbandry
Minor Subject: Economics

Thesis: THE GROWTH OF SHROPSHIRE SHEEP

Summary

The weight records of Shropshire lambs raised in the University of Illinois flock during the years 1921 to 1929, inclusive, were used in the construction of growth curves. The Brody formula ($W = A - B_e^{-kt}$) for growth, which may be considered as representing the law of diminishing increments, resulted in curves showing satisfactory agreement with the observed data. This formula has been found to be suitable for the determination of the rate of growth at any age. There were no significant indications of definite cycles of growth.

A part of the very rapid increase in weight in young lambs was due to an increasing food intake or "fill" and to the great increase in the size of the digestive tract. Many of the body parts developed more or less regularly during growth although certain organs, notably the stomach, intestines, and reproductive organs in males, showed extreme changes in rate of growth. Other organs, notably the pancreas and spleen, increased more rapidly than the empty body weight when the animals were young but later their development was retarded. The lean or muscular portion of the body when represented as a percentage of the empty weight, maintained a fairly constant ratio although lean and fat together tended to increase as age advanced. There seem to be more or less distinct sex differences in sheep in the relative weights of the fat, bone, blood, heart, kidneys and digestive tract.

EDUCATIONAL CAREER

B.S., University of Wisconsin, 1915

M.S., University of Illinois, 1917

Assistant and Assistant Professor of Sheep Husbandry, University of Illinois, 1915-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

AMEDA RUTH KING

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Saturday, May 30, 1931, 9 a. m.
424 Library Building

Committee in Charge:
- Professor William S. Robertson, *Chairman*
- Professor Laurence M. Larson
- Professor Albert H. Lybyer
- Professor Theodore C. Pease
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: History

First Minor Subject: Latin-American History

Second Minor Subject: Economics

Thesis: SOCIAL AND ECONOMIC LIFE IN SPANISH LOUISIANA, 1763-1783

SUMMARY

When Spain took over French Louisiana in 1763 she faced for the first time in her long colonial experience the problem of administering a province in the New World which she had not colonized. Her original plan seems to have been to change the French social and economic structure as slightly as possible. Between the years 1766 and 1769 Frenchmen in Louisiana, by an unsuccessful revolt, and by very unbecoming treatment toward a Spanish official as illustrious as Ulloa, brought upon themselves Spanish organization.

In 1769, O'Reilly suggested that Louisiana be made a definite unit in the Spanish imperial scheme. The old French superior council was abolished, and the Spanish cabildo, in Louisiana a local and provincial body with legal as well as executive powers, was substituted. Spanish law was translated into French, and was introduced into the colony. Some of these Spanish laws were found to be so just and so adequate that in Louisiana, and in other states carved out of that province, they have been incorporated into the codes of the modern states.

Spain's commercial policy now took two main trends. She modified the old commercial order in the direction of a more general leniency throughout the Indies. Louisiana profited from that modification. In addition, Louisiana received special favors necessary for her individual needs. Coupled with this commercial policy Spain showed a desire to stimulate interest in the natural products of Louisiana, especially an interest in those which fitted into her imperial organization.

The social life was not radically changed. A people, largely French, continued their daily life in the old French manner. They became Spanish by oath of allegiance. They were transferred to the Spanish Catholic organization, and placed in the spiritual care of the bishop of Cuba. They were offered an education supervised by Spanish teachers, and financed by the Spanish government.

To carry on the work of the province Spain spent her money freely. She sent over Spaniards of high rank and distinction to administer her rule. Twenty years of Spanish domination resulted in an improved social and commercial order. During the first half of her régime, Spain put more into Louisiana than she took out of the country.

EDUCATIONAL CAREER

A.B., University of Illinois, 1922

A.M., University of Illinois, 1925

Graduate Research Assistant in Illinois Historical Survey, 1922-1925

Assistant in History, University of Illinois, 1925-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

OSKAR ALFRED KUBITZ

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 22, 1931, 4 p.m.
Room 108, Administration Building

Committee in Charge:
  Professor Matthew T. McClure, *Chairman*
  Professor Albert W. Aron
  Professor Neil C. Brooks
  Professor Glenn R. Morrow
  Professor Guy A. Tawney

OUTLINE OF STUDIES

Major Subject: Philosophy
Minor Subject: German

Thesis: AN ACCOUNT OF THE DEVELOPMENT OF JOHN STUART MILL'S *SYSTEM OF LOGIC*

Summary

The present thesis is an attempt to give an exposition of the leading doctrines of Mill's *System of Logic* in their historical and biographical context. The former is to be found in the application of the experimental and deductive methods of physical science after Newton to the 'moral' sciences with the result that the psychological study of mental operations virtually displaced formal logic in the universities. The latter, of course, is Mill's intellectual history up to 1843.

In his article on Whately's *Elements of Logic* in 1828 Mill indicates that he is still perplexed by three problems. They are: (1) How can an account of terms be given which will use the results of psychology? (2) How can general reasoning be explained? (3) How can adequate premises for general reasoning be found? These problems are solved in Books I to III of the *Logic*. But prior to the completion of the third Book Mill was forced to modify his project as a result of Macaulay's criticism of James Mill's *Essay on Government*. He does so by rounding out his method in the *Definition of Political Economy* (1833) by adding to the already recognized operations of induction and syllogism the consideration of counteracting causes and verification. This change was induced by a study of Herschel's *Discourse*. In Whewell's *History of the Inductive Sciences* (1837) Mill at last finds the materials which enable him to complete the theory of induction. Comte's *Positive Philosophy* enabled him among other things to apply the already complete method of political economy to the remaining 'moral' sciences.

This biographical account in the historical context of the *Logic* makes it possible to trace a rather consistent development in four chief phases of Mill's thought: (1) the doctrine of the import of terms, propositions, and the operation of reasoning; (2) the doctrine of induction both of laws of succession and of coexistence; (3) the method of the 'moral' sciences; (4) the psychological treatment of axioms.

EDUCATIONAL CAREER

A.B., James Millikin University, 1924

A.M., University of Illinois, 1926

Assistant in Philosophy, University of Illinois, 1928-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ANANIAS CHARLES LITTLETON

FOR THE

Degree of Doctor of Philosophy

Monday, January 26, 1931, 9 a. m.
Room 209, Commerce Building

THE LIBRARY OF THE
JAN 27 1931
UNIVERSITY OF ILLINOIS.

Committee in Charge:

Professor Maurice H. Robinson, Chairman
Professor Ernest L. Bogart
Professor Edward J. Filbey
Professor Simon Litman
Professor Frederic A. Russell
Professor Nathan A. Weston

Outline of Studies

Major Subject: Economics

Minor Subject: Business Organization and Operation

Thesis: THE HISTORICAL FOUNDATIONS OF MODERN ACCOUNTING

SUMMARY

The economic significance of accounting suggests that its development was conditioned by economic and social circumstance.

It is found that, although bookkeeping has a long history, accounting has developed only after the beginning of the nineteenth century.

The nineteenth century witnessed the addition of at least three important elements to bookkeeping which together are sufficient to explain the superior place accorded accounting. They are as follows:

1. A body of *technical doctrines* centered about the distinction between capital and income which are especially apropos to the regime of the modern business corporation. This is *Theory.*
2. A body of *technical operations* or manipulations of accounting data arranged to reflect effectively the progressive conversions of material, labor and services into product, and to allocate costs to units of time or product in order that income may finally be associated directly with its cost. This is *Costing.*
3. A body of *technical procedures* connected with the verification and reporting by professionals of the financial data needed by all of the contributors of the economic capital employed in a specific enterprise. This is *Auditing.*

As a result of this expansion of the purpose and scope of bookkeeping a new discipline appears—accounting—which in its main subdivisions so closely parallels the outline of the method of science that it may be called a scientific procedure.

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EDUCATIONAL CAREER

A.B., University of Illinois, 1912

A.M., University of Illinois, 1918

C.P.A., Illinois, 1919

Instructor in Accountancy, University of Illinois, 1915

Associate Professor in Accountancy since 1925

Assistant Dean, College of Commerce, University of Illinois, 1919-1922

Assistant Director, Bureau of Business Research, University of Illinois, since 1922

PUBLICATIONS

Italian double entry in early England, *The Accounting Review,* 1:2

The evolution of the ledger account, ibid., 1:4

The antecedents of double entry, ibid., 2:2

Two fables of bookkeeping, ibid., 2:4

Paciolo and modern accounting, ibid., 3:2

Evolution of the journal entry, ibid., 3:4

Die Entwicklung des Rechnungswesens in der Vereinigten Staaten. *Zeitschrift fur Handleswissenschaft und Handlespraxis.* 22:4

Die heutige stand der berufsmaessigen Revisionswesens in der Vereinigten Staaten. *Die Betriebswirtschaft,* 23:6

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LUNG CHUNG

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, June 1, 1931, 9 a.m.
Room 209 Commerce Building

Committee in Charge:
- Professor Nathan A. Weston, Chairman
- Professor Ernest L. Bogart
- Professor Edward J. Filbey
- Professor Horace M. Gray
- Professor Merlin H. Hunter
- Professor David P. Locklin
- Dean Charles M. Thompson
- Professor Max J. Wasserman

OUTLINE OF STUDIES

Major Subject: Economics

First Minor Subject: Transportation

Second Minor Subject: Business Organization and Operation

Thesis: THE FEDERAL WATER POWER ACT OF 1920: ITS ADMINISTRATION AND CONSEQUENCES

SUMMARY

Previous legislation (in 1901 and 1910) had proved to be a failure as licenses conferred only an uncertain tenure which made the financing of water power developments difficult. The Federal Water Power Act of 1920 is designed to encourage the development of the nation's water power resources and at the same time to protect public interests, particularly those of conservation. The passage of the Act has been one of the most important factors that have contributed to the large water power development of the last decade. The policies of the Federal Power Commission in granting the right of development seem as a whole to be in harmony with the provisions of the Act, compatible with public interests, and in keeping with the broader basis of water power regulation, the aim of which is to secure a comprehensive scheme of development of the nation's water power resources. The danger arises in the situation when the Commission has not fundamental data upon which alone it is possible to make correct conclusions in deciding upon applications. The Commission is placed in the anomalous position of being required by the law to ascertain the necessary comprehensive scheme of development of the nation's water power resources for the purposes of navigation, water power, and other beneficial public uses, while at the same time, it is stopped by budgetary limitations from continuing those general investigations which are essential to a scientific performance of its legal obligation. In spite of the creditable showing in the authorization of permits and licenses, the Commission has failed to measure up to the expectations of those who were responsible for its establishment. Although the Act has encouraged water power development, the Commission has failed from the very beginning to protect either the consumers or the investors. The Commission's failure in these respects has been particularly felt in the regulation of accounting practices, rates, service, and finances. The Amendment of 1930 corrects the defect of the Act only to the extent that the Commission is given an independent status with appointed Commissioners instead of an ex-officio body, composed of the Secretaries of War, the Interior, and Agriculture. It is clear, therefore, that the Federal Water Power Act of 1920 represents a further step in the direction of complete regulation of the water power resources under Federal control. Yet this regulation is still incomplete or inadequate. Despite the amendment made in 1930, some problems yet remain to be solved.

EDUCATIONAL CAREER

B.S., University of Illinois, 1927

M.S., University of Illinois, 1927

Fellow in Economics of Public Utilities, University of Illinois, 1927-1929

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ROBERT LAVERN MATLOCK

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Saturday, May 23, 1931, 8 a.m.
Room 305, Agriculture Building

Committee in Charge:
Professor William L. Burlison, *Chairman*
Professor John T. Buchholz
Professor George H. Dungan
Professor Charles F. Hottes
Professor Laurence J. Norton
Professor Raymond S. Smith
Professor Charles L. Stewart
Professor Clyde M. Woodworth

OUTLINE OF STUDIES

Major Subject: Agronomy

Minor Subject: Agricultural Economics

Thesis: THE EFFECTS OF ARTIFICIALLY PRODUCED LOW TEMPERATURES UPON DENT CORN GRAIN AT VARIOUS STAGES OF MATURITY

Summary

1. (a) When the average kernel moisture content was lower than 39 per cent, no duration of exposure, at temperatures down to −5° C., was distinctly injurious to the germination of any variety of corn studied. With kernels of higher moisture content, −5° C., when maintained for 5 hours, was only slightly injurious to germination. (b) All temperatures between −5 and −10° C., when maintained more than 6 hours, were critical to the germination of kernels having more than 22 per cent moisture. (c) After exposure for 8½ hours at −10.2° C., the average germination of Funk 176-A corn ears was reduced to 74 per cent, and that of Hybrid 365 to 78.8 per cent, altho the hybrid kernels, when exposed, were a few per cent higher in moisture content. Later, 18 hours at −7.8° C. reduced the average germination of Funk 176-A ears to 58 per cent and that of Hybrid 365 to 45 per cent, even though the hybrid kernels were a few per cent lower in moisture content. (d) After 12 hours at −11° C., kernels from husked ears of Funk 176-A, containing 16 per cent moisture, germinated 90.2 per cent (8.8 per cent less than the controls). Similar ears of Reid Yellow Dent, containing 15.1 per cent kernel moisture, germinated 92.5 per cent (5.5 per cent less than the controls), after exposure for 10 hours at −12° C. (e) After exposure for 10 hours at −12° C., Reid Yellow Dent ears, dried normally on the stalks in the field to 15 to 18 per cent kernel moisture, germinated from 3 to 16 per cent better than did ears dried to a similar moisture content by being cured either in the open air or in a warm, well ventilated room.

2. (a) Temperatures down to −5° C., maintained for periods as long as 15 hours, caused no significant reductions in average seedling vigor in any variety of corn used. (b) Temperatures below −5° C. had no effect on average seedling vigor unless applied for long periods (14 hours or more) and to corn having a kernel moisture content of 25 per cent or more. (c) The vigor of the seedlings, produced from kernels still having more than 25 per cent moisture after natural curing in the field, was reduced by an exposure for 10 hours at −12° C. (d) Unnatural methods of curing were more injurious to seedling vigor than was exposure to low temperature. Kernels from ears dried naturally to a low kernel moisture content (23 per cent) produced more vigorous seedlings, after 12 hours at −17.8° C., than did kernels from ears dried to 16 per cent after three days in a commercial drying room. (e) Low temperatures did not reduce the vigor of seedlings from exposed ears unless they were either, (1), of long duration and lower than −5° C., or, (2), lower than −5° C. and applied to corn still having more than 25 per cent kernel moisture after natural drying, or, (3), they were lower than −5° C. and applied to corn cured unnaturally having even less than 25 per cent kernel moisture.

3. (a) In general, seedlings from exposed ears were more often attacked by fungi than were control ear seedlings. (b) Following the exposures, less severe as to degree of temperature, the percentage of seedlings attacked by fungi increased with the moisture content. After the more severe exposures, there was little, if any, relation between the moisture content of kernels and percentage of seedlings infected. (c) Husked ears, partially cured by means of artificial heat, produced seedlings more highly infected with disease organisms than did similar ears cured naturally in the open air or ears uncured before exposure.

EDUCATIONAL CAREER

B.S., University of Illinois, 1924

Instructor in Vocational Agriculture, Yorkville, Ill., 1924-1927

M.S., University of Illinois, 1928

Assistant in Crop Production, University of Illinois, 1927-1930

Fellow in Agronomy, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

GERALD EVERETT MOORE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 28, 1931, 2 p. m.
Room 254, Mathematics

Committee in Charge:
- Professor Arthur B. Coble, *Chairman*
- Professor Robert H. Baker
- Professor Robert D. Carmichael
- Professor Arnold Emch
- Professor George A. Miller

OUTLINE OF STUDIES

Major Subject: Mathematics
First Minor Subject: Algebra
Second Minor Subject: Astronomy

Thesis: THE FOUR-TERMED THETA IDENTITIES ARISING FROM A GENERALIZATION OF THE WEDDLE SURFACE IN S_4

SUMMARY

In a generalization of the Weddle surface, there arise certain three-term and four-term identities, connecting the theta functions. In this paper the four-termed relations are examined. These are analyzed into classes and a complete set of all classes of identities is exhibited. Each of these theta identities is put into projective form, and it is shown that all of the projective identities can be obtained from four properly chosen relations by Cremona involutions.

Some of the identities yield equations of the P-loci of the parametric representation. For some of the identities the base is discussed and tactical processes are exhibited by means of which the base can be obtained directly from an examination of the theta identity. The existence of a set of thirty-five diagonal lines on a surface V_2^{11}, of order eleven, is also established.

EDUCATIONAL CAREER

B.S., Hedding College, 1922

M.S., University of Illinois, 1923

Scholar in Mathematics, University of Illinois, 1922-1923

Professor of Mathematics, Hanover College, 1923-1927

Assistant in Mathematics, University of Illinois, 1927-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CHARLES MELTON PEGUES

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 7, 1931, 7:30 p.m.
Room 212, Lincoln Hall

Committee in Charge:

Professor David H. Carnahan, *Chairman*
Professor Arthur Hamilton
Professor Albert H. Lybyer
Professor Régis Michaud
Professor Thomas E. Oliver
Professor John Van Horne

OUTLINE OF STUDIES

Major Subject: Romance Languages (French)
First Minor Subject: Spanish
Second Minor Subject: History

Thesis: SPANISH LITERATURE AS PORTRAYED IN THE *REVUE DES DEUX MONDES*

Summary

In August 1929 the *Revue des Deux Mondes* celebrated the centenary of its foundation. At that date 2,377 issues had appeared.

The general tone of the articles on Spanish literature is scholarly and sympathetic.

The French critics are particularly interested in the drama of the *siglo de oro* and the 19th century; as a rule, poetry is neglected.

Three scholarly and exhaustive articles cover poetry before the *siglo de oro.* Several excellent articles of a biographical nature deal with Santa Teresa and Antonio Pérez.

The drama of the *siglo de oro* is treated with many details. Five articles by de Viel-Castel discuss the use of honor, the historical and religious drama, and the works of Tirso de Molino and Augustín Moreto.

Six essays are devoted to Miguel de Cervantes; four are excellent critical studies, the other two are book reviews of contemporary publications on Cervantes.

There are no articles on the literature of the 18th century.

The literature of the first half of the 19th century is presented in analytical studies; that of the second half of the century, excepting the works of Pérez Galdós, is only fragmentarily treated.

Don Miguel de Unamuno is the only Spanish author of the 20th century to receive attention by the *Revue.*

Considering that there is no organized plan of presentation on the part of the editors of the *Revue*, the field of Spanish literature has been well covered.

EDUCATIONAL CAREER

A.B., University of Texas, 1924

A.M., University of Texas, 1924

Instructor in French, Hillsboro Junior College, Hillsboro, Texas, 1924-1925

Assistant Professor of Modern Languages, Georgetown College, Georgetown, Kentucky, 1925-1928; acting-head of the department, 1927-1928

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DONALD DURAND PEIRCE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, September 30, 1931, 2 p.m.
Room 105, Chemistry Annex

THE LIBRARY OF THE
SEP 30 1931
UNIVERSITY OF ILLINOIS

Committee in Charge:
- Professor B. Smith Hopkins, Chairman
- Dr. John C. Bailar, Jr.
- Professor Charles T. Knipp
- Professor Worth H. Rodebush
- Professor Ralph L. Shriner

OUTLINE OF STUDIES

Major Subject: Chemistry (Inorganic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: THE SEPARATION OF COLUMBIUM AND TANTALUM: STUDIES ON THE PRECIPITATION OF REDUCED COLUMBIUM: STUDIES ON THE PLATING OF COLUMBIUM AND TANTALUM FROM AQUEOUS SOLUTIONS: STUDIES ON THE PLATING OF VANADIUM AND ZIRCONIUM FROM AQUEOUS SOLUTIONS

SUMMARY

1. A new type of cell has been designed for the rapid reduction of a solution of pentavalent columbium to the tervalent state.

2. The effect of a number of inorganic precipitating agents on reduced columbium solutions has been tested.

3. A metallic plate of columbium metal has been prepared on a copper base by electrolysis of a saturated solution of sodium carbonate containing columbium pentoxide.

4. It has been found that electrolysis of a sodium carbonate bath containing tantalum pentoxide does not give a metallic plate on a copper base, but that a bath containing a mixture of the oxides of columbium and tantalum does give a metallic plate.

5. The plates obtained as mentioned above have been spectroscopically examined and found to be tantalum-free columbium.

6. It has been found impossible to plate vanadium from a bath similar to the one from which columbium was plated.

7. One indication of a metallic plate has been obtained from a sodium carbonate bath containing freshly precipitated zirconium hydroxide. The result has not been duplicated.

EDUCATIONAL CAREER

B.A., Oberlin College, 1923

M.A., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HARRIS EUGENE PHIPPS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Saturday, May 30, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor John H. Reedy, *Chairman*
- Doctor Ludwig F. Audrieth
- Professor George L. Clark
- Professor Charles T. Knipp
- Professor Worth H. Rodebush

OUTLINE OF STUDIES

Major Subject: Chemistry (Inorganic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: OBSERVATIONS ON POLYMORPHISM

Summary

I. A modification of the solubility method for determining transition temperatures has been worked out. The refractive indices of saturated solutions of the different modifications were determined at different temperatures by means of a dipping refractometer. This method is quicker, less tedious and as accurate as the solubility method. The hydrate transition temperatures of sodium carbonate and sodium sulfate were determined in order to check the method. The results checked those of Richards and others to within 0.02° C.

II. Modifications III and IV of ammonium nitrate were studied by means of a petrographic microscope. This study, as well as a search of the literature, convinced us that both forms belong to the orthorhombic system.

III. The transition temperature of carbon tetrachloride was carefully redetermined by the thermometric method, using a five junction thermocouple. The temperature was found to vary by several tenths of a degree, depending on the rate and direction of temperature change. The best value was $-47.7° \pm 0.2°$.

IV. A pink modification of silicon tetrachloride has been observed. It changes reversibly to the white form somewhere near $-140°$. This may indicate a new dimorphic substance.

EDUCATIONAL CAREER

A.B., Oberlin College, 1926

A.M., Oberlin College, 1928

Illinium Research Fellow, University of Illinois, 1928-1930

Fellow in Chemistry, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EZRA HENRY PIEPER

FOR THE

Degree of Doctor of Philosophy

Tuesday, April 7, 1931, 9 a. m.
Room 424A, Library Building

THE LIBRARY OF THE
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UNIVERSITY OF ILLINOIS

Committee in Charge:

Professor Marcus L. Hansen, Chairman
Professor Frederick C. Dietz
Professor Laurence M. Larson
Professor Albert H. Lybyer
Professor John M. Mathews
Professor William S. Robertson

Outline of Studies

Major Subject: History

First Minor Subject: American History

Second Minor Subject: International Law

Thesis: THE FENIAN MOVEMENT

SUMMARY

The Fenian Brotherhood was an organization of Irish-Americans founded in the late 1850's to extend financial, military and political aid to the revolutionary movement in Ireland. Its membership and enthusiasm received a great impetus during the American Civil War in which many recent Irish immigrants participated. But in 1865 two factions appeared in the organization, one demanding that the Brotherhood embarass England and probably provoke a British-American war by an invasion of Canada and the other insisting that efforts be directed towards sending funds and military leaders to the insurrectionists in Ireland. Unable to agree, each faction attempted to carry out its program: the former organizing raids into Canada in 1866, 1870 and 1871, and the latter rendering assistance to the rising of 1867.

In all these enterprises Fenians claiming American citizenship were captured and tried by the British. The British Government, already angered by the failure of the United States to suppress the movement, ignored their claims of citizenship and the United States was forced to intervene. As a result of this intervention most of the prisoners were released but, in the meantime, the hostility growing out of the British attitude during the Civil War was intensified, the differences of opinion regarding the right of expatriation were brought to a head, and a large group of voters alienated from President Johnson.

An effort has been made, in presenting the narrative of the rise, progress and decline of the Brotherhood to distinguish between the policies and activities of the two factions and thereby remove the confusion apparent in previous accounts. In judging the responsibility of the United States Government, the vigilance of the Army and the Secret Service in frustrating the military plans of the Fenians (a factor hitherto ignored) has been emphasized. The tardiness of the President's proclamation is, therefore, of less significance. The recruiting methods of the organization, the development of its constitution, its financial success and failure are described. Finally, the attitude of the Catholic Church towards the Brotherhood is analyzed.

The principal sources consist of files of the newspaper organs of the two factions of the Brotherhood, convention proceedings, controversial pamphlets, memoirs and biographies, in the Collins Collection in the Library of the University of Illinois, and the manuscript consular and diplomatic dispatches in the archives of the Department of State at Washington.

EDUCATIONAL CAREER

A.B., North-Western College, 1925
A.M., University of Illinois, 1926
Scholar in History, University of Illinois, 1925-1926
Assistant in History, University of Illinois, 1927-1930
Professor of History, Duluth State Teachers' College, 1930-.

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THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ORIN WAINWRIGHT REES

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, May 25, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor G. Frederick Smith, *Chairman*
- Professor Roger Adams
- Professor George L. Clark
- Professor Ralph L. Shriner
- Professor Fred W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry (Analytical)
First Minor Subject: Organic Chemistry
Second Minor Subject: Bacteriology

Thesis: STRUCTURAL RELATIONSHIPS ASSOCIATED WITH THE HYDRATION OF CERTAIN ALKALINE EARTH METAL PERCHLORATES

SUMMARY

From a knowledge of the structural relationships exemplified in the various forms of hydrates of perchloric acid previously studied new forms of hydrated magnesium salts of perchloric acid hitherto unknown were postulated. These new forms of hydrated magnesium perchlorate have therefore been sought, conditions for their preparation studied and applications given in the use of one of them in extending the already wide use of magnesium perchlorate drying agents in the commercial drying of gases.

The various hydrates of magnesium perchlorate containing two, three, four and six molecules of water for each molecule of magnesium perchlorate correspond to those predicted from a knowledge of the known coordination numbers attributed to the magnesium cation. The non-existence of hydrates with a greater number of molecules of water indicate that the perchlorate anion is not hydrated. The interpretation, using the electronic conception of valence, of the structure of the various hydrates of perchloric acid indicates also a hydration only in association with the cation and where hydration of the perchlorate anion is postulated the modification is known to be unstable.

Small scale and large scale regeneration apparatus has been designed and built, the construction and operation of which follows the properties disclosed for the products in question associated with the most important of the hydrates of magnesium perchlorate studied in connection with the present work. This study was carried out under the following heads: (1) Vapor Pressure, (2) Heats of Solution, (3) X-ray Structure and (4) Porosity Determination.

EDUCATIONAL CAREER

B.S., Earlham College, 1922
M.S., University of Illinois, 1925

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CHARLES GORDON REEVES

FOR THE

Degree of Doctor of Philosophy

Wednesday, January 28, 1931, 3 p. m.
Room 208, Commerce Building

THE LIBRARY OF THE
JAN 27 1931
UNIVERSITY OF ILLINOIS.

Committee in Charge:

Professor Nathan A. Weston, Chairman
Professor Horace M. Gray
Professor Simon Litman
Professor Maurice H. Robinson
Professor Herbert Woodrow
Professor Ivan Wright

OUTLINE OF STUDIES

Major Subject: Economics
Minor Subject: Psychology

Thesis: A COMPARATIVE STATISTICAL STUDY OF THE INTEREST RATES PREVAILING IN FEDERAL RESERVE BANK CITIES FROM 1919 TO 1929

SUMMARY

The purpose of this study was to determine the extent of the variations in the interest rate on short term loans in the principal money markets of the United States and the cause or causes of these variations. This statistical analysis of interest rates and commercial bank data, which covers the ten year period from 1919 to 1929, is divided into seven parts:

I. A statement of the absolute differences in the interest rates of the commercial banks in the twelve Federal Reserve cities. The three types of loans included were commercial, stock exchange collateral, and inter-bank loans.

II. The effect upon interest rates of variations in risk and in the length of the loan period.

III. The trend and the seasonal and cyclical fluctuations of the rates on 30 to 90 day commercial loans in the Federal Reserve cities. The downward trend of commercial bank and open market rates. The greater amplitude of the cyclical fluctuations of the loan rates in the larger money markets. The absence of any close correspondence in the seasonal variations of the loan rates in the principal money markets of the United States.

IV. The relation between the rediscount rates of the Federal Reserve Banks and the rates charged customers by the commercial banks of the Federal Reserve cities. The lower level and greater stability of the rediscount rates. The failure of the rediscount rates to advance as rapidly as the loan rates of commercial banks. The minor and indirect influence of the rediscount rates upon the rates charged customers by the commercial banks.

V. A comparison of the loan rates of commercial banks and the open market rates. The lower level and more erratic movements of open market rates. The more pronounced downward trend of these rates. The difference between the seasonal variations in the open market rate on four to six months commercial loans and those on 30 to 90 day stock exchange collateral and call loans. The greater cyclical fluctuations of open market rates. The lag in the loan rates of commercial banks and their imperfect adjustment to those in the open market.

VI. The relation between the rates charged customers by the commercial banks and certain demand and supply factors in the money markets. The ratio of total loans to total resources. The ratio of total loans to total deposits. The ratio of capital liabilities to loans. The ratio of due from to due to banks. The relation between each of the above ratios in each money market and the loan rate in that market.

VII. Summary and conclusions.

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EDUCATIONAL CAREER

A.B., University of North Carolina, 1924
A.M., University of North Carolina, 1925
Assistant in Economics, University of Illinois, 1927-1928

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LESLIE JAMES ROLL

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 22, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor Roger Adams, *Chairman*
- Professor Donald B. Keyes
- Professor Charles T. Knipp
- Professor Worth H. Rodebush
- Professor Ralph L. Shriner

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: A STUDY OF THE ENOLIZATION OF CERTAIN BETA-DIKETONES AND BETA-KETO ESTERS

SUMMARY

A method is proposed for the determination of the position of enolization in certain β-diketones and β-keto esters, which consists of the preparation of a stable ester derivative of the enol form, subsequent catalytic reduction of the double bond and removal of the acyl group by saponification. The β-hydroxy ketones and β-hydroxy esters thus formed may be identified by converting into unsaturated ketones or esters.

Experiments showed that an acetoxy group could be removed under the conditions of reduction with the formation of saturated ketones or esters. This modified method was used to show that in a series of β-diketones including benzoyl acetone, benzoyl propionyl methane, and benzoyl butyryl methane, enolization takes place on the aliphatic acyl group.

Preliminary work indicates that as an alternative method, ammonia may be used to replace the enol group with an amino group and the subsequent reactions carried out as proposed for the enol-acylates.

Evidence is presented which indicates that the catalytic reduction of ketones to hydrocarbons in glacial acetic acid solution may proceed through an intermediate acetate ester of the carbinol.

EDUCATIONAL CAREER

B.S., Oregon State Agricultural College, 1927

M.S., University of Illinois, 1928

Assistant in Chemistry, University of Illinois, 1927-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ROBERT COOKE ROSS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, May 26, 1931, 3 p.m.
Room 215, Commerce Building

Committee in Charge:
- Professor Charles L. Stewart, *Chairman*
- Professor Harold C. M. Case
- Professor Ernest L. Bogart
- Professor Merlin H. Hunter
- Professor Laurence J. Norton
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: Economics
First Minor Subject: Farm Organization and Management
Second Minor Subject: Economic History

Thesis: THE INFLUENCE OF TYPE OF PRODUCTION AND SIZE OF FARM ON ILLINOIS FARM EXPENSES, 1926-1928

Summary

There is a high degree of uniformity from year to year in the expenses on individual farms because agricultural production is that of an essentially biological industry, dealing with living things; has a high proportion of fixed to variable expenses, and slow rates of turnover. It was the purpose of this inquiry to determine the extent and nature of the differences which occur in expenses among farms in Illinois. The basic data for the study were taken from the financial records of 475 Illinois farms for the three-year period, 1926-1928.

Within the eight farming type areas of the state, the various items of operating and maintenance expense were found to bear rather definite relationships to the size of the farm unit. The more intensive production on the smaller farms, however, tended to place overemphasis upon the influence of size. When farms in central Illinois were closely selected on the basis of sources of income, the progressively greater intensity of production represented by farms designated as grain, diversified, hog, cattle and hog, and dairy farms was associated with correspondingly higher total expenses. Within each of these farming systems total expenses per 100 acres declined as the acreage increased. In both cases some items of expense were influenced to a greater extent than others.

A detailed examination of the current expenses and capital expenditures indicated that the outlays made were largely for those kinds of current operation or semi-fixed assets which would directly increase the farm income within a relatively short period, while the fixed assets in buildings and fences were not being maintained.

Working standards, which provided for operating expenses and for the maintenance of the productive plant, were developed for farms of 80, 160, 240, and 320 acre units under grain, diversified, hog, and cattle and hog systems of production. An appraisal of these standards was made and current changes likely to affect their validity were examined.

EDUCATIONAL CAREER

A.B., Monmouth College, 1914

B.S., University of Illinois, 1923

M.S., University of Illinois, 1925

Assistant, Associate and Assistant Professor in Farm Organization and Management, University of Illinois, 1923-1930

Extension Specialist in Agricultural Economics, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HILARIO SÁENZ Y SÁENZ

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, May 27, 1931, 7:30 p. m.
Room 212, Lincoln Hall

Committee in Charge:
- Professor Arthur Hamilton, Chairman
- Professor José A. Balseiro
- Professor David H. Carnahan
- Professor William A. Oldfather
- Professor Thomas E. Oliver
- Professor John Van Horne

OUTLINE OF STUDIES

Major Subject: Romance Languages (Spanish)
First Minor Subject: Italian
Second Minor Subject: Latin

Thesis: ASPECTOS DE LA VIDA ESPAÑOLA A TRAVÉS DE LAS OBRAS DE DON BENITO PÉREZ GALDÓS

Summary

Galdós is the most national Spanish writer of the 19th century. No other writer has given us a more comprehensive view of the daily life of the Spain that immediately preceded ours and with which it is intimately related.

The picture that Galdós has to offer is a gloomy one:

In *Religion,* clericalism, fanaticism, and lack of sincere religious feeling are strongly shown.

In *Politics,* the Parliamentary System appears corrupted with nepotism, caciquism and bureaucracy.

Society is represented as a mob. The vanity of the decadent nobility and of the new social climbers is prominent. Ambition fostered by wild imaginations brings disaster to women especially. Children grow up in abandonment. They are rogues. What kind of a society will come out from these rogues?

Types and Typical Customs tend to disappear from Spain. Yet there are customs such as the bull-fight, and the national lottery, that seem to be rooted in the soul of the Spanish.

In conclusion it may be said that Galdós presents the evils, and often he offers remedies for them, but these remedies are never complete solutions to the problems. In his love for progress he has laid stress on the evils and has dealt little with the brighter side. Some allowance should be made for the light to enter into the dark picture that he has given us.

EDUCATIONAL CAREER

B.A., Indiana University, 1923

M.A., University of Chicago, 1928

Assistant in Romance Languages, University of Illinois, 1927-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JAMES MEADOWS SANDERS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, June 2, 1931, 9 a. m.
Room 304, University Hall

Committee in Charge:
- Professor Waldo Shumway, *Chairman*
- Professor Leverett A. Adams
- Professor Victor E. Shelford
- Professor Fred W. Tanner
- Professor Harley J. Van Cleave
- Professor Henry B. Ward
- Professor Charles Zeleny

OUTLINE OF STUDIES

Major Subject: Zoology (Embryology)
First Minor Subject: Comparative Anatomy
Second Minor Subject: Bacteriology

Thesis: A COMPARATIVE STUDY OF THE DEVELOPMENT OF THE THYREOID GLAND IN REPRESENTATIVE TYPES AMONG THE URODELES

SUMMARY

A microscopical study has been made of the development of the thyreoid gland as seen in the four families of North American Urodeles. From this study the typical development of the thyreoid is described. The developmental stages in each species examined have been compared and conclusions drawn as to the relation of thyreoid development to normal metamorphosis.

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EDUCATIONAL CAREER

A.B., William Jewell College, 1926

A.M., University of Illinois, 1927

Assistant in Zoology, University of Illinois, 1926-1929, 1930-1931

Instructor in Zoology, University of New Hampshire, 1929-1930

PUBLICATIONS

Shumway, W. and Sanders, J. M. 1928. *The Development of the Thyreoid Gland in Necturus*, Anatomical Record, vol. 41 (Abstract of master's thesis)

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ELMER CLARENCE SANDMEYER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, December 21, 1931, 7 p.m.
Room 416 Lincoln Hall

COMMITTEE IN CHARGE:
- PROFESSOR THEODORE C. PEASE, Chairman
- PROFESSOR FREDERICK C. DIETZ
- PROFESSOR JAMES W. GARNER
- PROFESSOR ALBERT H. LYBYER
- PROFESSOR JAMES G. RANDALL

OUTLINE OF STUDIES

Major Subject: History
First Minor Subject: English History
Second Minor Subject: Political Science

Thesis: THE ANTI-CHINESE MOVEMENT IN CALIFORNIA

Summary

The coming of the Chinese was but a minor phase of that larger movement by which the major portion of the United States has been populated during the last one hundred years.

The principal motive back of their coming was the opportunity for economic improvement, and those of religious and political liberty seem to have been almost entirely lacking. Their coming was stimulated by the cheapness of transportation and by the demand for labor in a rapidly developing frontier community. A very large proportion of this immigration was assisted and bore the appearance, at least, of many of the features of the "coolie traffic."

The fundamental basis of opposition to the Chinese was the antagonism of race and the apparent unwillingness of the Chinese to assimilate. Along with this went opposition to the competition of low priced and apparently servile labor and to the Chinese quarters, with their crowded and unsanitary living conditions, their strange customs, vices and diseases, and their organizations whose purpose seemed to be to control the Chinese and to make possible the evasion of the laws of the state.

At first California attempted to solve this problem with its own resources. Organized labor supplied the initiative, and the Workingmen's Party was for a few years the high-light of this movement. While the influence of its leader, Dennis Kearney, has been overemphasized, it may truly be said that "He put the fear of the toiler into the heart of the politician." Numerous laws were enacted and a final effort was made in connection with the new constitution, but practically all of these actions were made ineffective, either by inadequate enforcement or by the decisions of the United States courts.

Disappointed with the results of local efforts the anti-Chinese forces turned to the Federal government. By means of petitions, memorials, investigations and propaganda, aided by the growing national organizations of labor and especially by the fact that the two great political parties were very evenly balanced, they were able to secure the adoption of a policy of exclusion in regard to Chinese labor and of strict regulation in regard to all other forms of Chinese immigration.

EDUCATIONAL CAREER

A.B., Iowa Wesleyan College, 1917

B.D., Garrett Biblical Institute, 1918

A.M., University of Illinois, 1924

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ARTHUR CURTIS SHEAD

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, May 27, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor G. Frederick Smith, *Chairman*
- Professor Duane T. Englis
- Professor Reynold C. Fuson
- Professor Ralph L. Shriner
- Professor Fred W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry (Analytical)
First Minor Subject: Organic Chemistry
Second Minor Subject: Bacteriology

Thesis: ORIGINAL AND MODIFIED PROCEDURES AS APPLIED TO THE SEPARATION AND DETERMINATION OF THE ALKALI METALS

SUMMARY

The thesis treats of:

1. The substitution of lithium chlorplatinate for chlorplatinic acid in the precipitation of potassium according to the Fresenius method, thereby obtaining a stoichiometric conversion factor instead of the empirical one of the older process, through elimination of HCl acidity.

2. The development of the perchlorato-chlorplatinate method for the determination of the alkalis, consisting of the precipitation of a hot saturated solution of the weighed mixed perchlorates in 50 percent alcohol-water, with sufficient chlorplatinate reagent to unite with the potassium only, thereby increasing the accuracy and lowering the cost of the determination.

3. The new universal spectro-photographic method for the quantitative determination of the elements, wherein a line isolated from a mixed spectrum by an exit slit of a spectroscope, in the usual manner, is allowed to fall upon a sensitive film attached to a rotating drum in a special camera. The rotation serves to equalize any flickering of the light source and to produce a uniform band the depth of shade in which is a measure of the concentration of the element under examination and is to be compared in intensity with known concentrations of the same element, treated in like manner.

4. A new process for the decomposition of refractory alkali silicates and aluminates, in which is combined the best features of the hydrofluoric acid and the J. Lawrence Smith methods, together with an entirely novel procedure, consisting of (a) the decomposition of the silicate with immediate elimination of silica by ammonium fluoride fusion, and (b) the decomposition of alkali fluoaluminates with fused basic calcium oxychloride.

EDUCATIONAL CAREER

B.S., University of Oklahoma, 1919

M.S., University of Oklahoma, 1923

Assistant in Chemistry, University of Illinois, 1923-1924

Research Assistant in Chemistry, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ARTHUR LEE SHUCK

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 26, 1931, 10 A.M.
Room 155, Natural History Building

COMMITTEE IN CHARGE:
- PROFESSOR CHARLES F. HOTTES, *Chairman*
- PROFESSOR JOHN T. BUCHHOLZ
- PROFESSOR WILLIAM L. BURLISON
- PROFESSOR BJORN T. PALM
- PROFESSOR FRED W. TANNER
- PROFESSOR ARTHUR G. VESTAL

OUTLINE OF STUDIES

Major Subject: Botany (Plant Physiology)
First Minor Subject: Pathology
Second Minor Subject: Agronomy

Thesis: STUDIES ON THE GROWTH OF PLANTS AT DIFFERENT ATMOSPHERIC PRESSURES

SUMMARY

1. The growth of wheat, sunflower and Canada field pea seedlings was studied at 506 mm. and 253 mm. atmospheric pressure.

2. The response in growth at these pressures is dependent on the temperature, that is, a reduction of the pressure is favorable for growth at 15° C., but causes a decrease in growth at 30° C.

3. At 15° C. the increased growth was marked only during the early stages of growth and exposure.

4. Under the same pressure and temperature conditions the growth of roots follows in a general way the growth of shoots.

5. An increase in the atmospheric pressure to 20 lbs. and 50 lbs. per square inch caused a slowing down of the rate of growth and a reduction in the total growth.

EDUCATIONAL CAREER

A.B., Central College (Missouri), 1925

A.M., University of Missouri, 1927

Assistant in Botany, University of Illinois, 1929-1930

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WAYNE ANDREW SISSON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 22, 1931, 3 p.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor George L. Clark, *Chairman*
- Doctor John C. Bailar
- Professor Duane T. Englis
- Professor B. Smith Hopkins
- Professor Elmer H. Williams

OUTLINE OF STUDIES

Major Subject: Chemistry (Analytical)
First Minor Subject: Inorganic Chemistry
Second Minor Subject: Physics

Thesis: X-RAY STUDIES OF ROLLING AND HEAT TREATMENT OF SHEET METALS

SUMMARY

A discussion is given of the theory of plastic flow, X-ray analysis of deformed metals and the technique of preparing specimens for X-ray examination.

The change in orientation of the crystal fragments during successive stages of reduction was investigated by X-ray diffraction methods. The preferred orientation in cold rolled metals was studied in connection with the character of the starting material and variations in the rolling process. The orientation obtained by the separate or simultaneous application of tension and compression in deforming metals is discussed.

The recrystallization structure was studied in relation to the time and temperature of annealing, the method of rolling and regions of critical deformation. The relation between the per cent reduction, grain size and residual orientation of the annealed strip was investigated for high per cent reductions over large temperature ranges.

EDUCATIONAL CAREER

B.S., Roanoke College, 1925

Assistant in Chemistry, University of Illinois, 1928-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HOWARD AGNEW SMITH

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 29, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor George L. Clark, *Chairman*
- Doctor David G. Bourgin
- Professor B. Smith Hopkins
- Professor G. Frederick Smith
- Doctor Leonard L. Steimley

OUTLINE OF STUDIES

Major Subject: Chemistry
Minor Subject: Mathematics

Thesis: (A) SPECTROSCOPIC STUDIES OF THE RADIATION PHENOMENA OCCURRING IN INTERNAL COMBUSTION ENGINES

SUMMARY

The necessary apparatus has been designed and assembled such that, within suitable limits, the following independent variables could be varied with facility and accuracy: Charge density, temperature and composition; voltage, current, timing and placement of the ignition spark; jacket temperature; design of combustion chamber; and speed. The dependent variables considered are: Load, knock, reaction pressure; the emission spectrum of the flame; and rate of flame propagation.

The spectra show that there is a very pronounced difference particularly with regard to intensity between the radiation emitted from rich or lean mixtures under any conditions of operation. In addition to the normal flame spectrum, when knocking occurs, a large amount of high energy radiation is emitted reaching a maximum after primary inflammation takes place.

The spectra agree with the anti-knock action of dopes as postulated by Egerton and Gates.

Other measurements indicate that the detonation wave theory of knock is no longer tenable.

(B) AN X-RAY DIFFRACTION STUDY OF FRACTIONATED PARAFFIN WAXES

A fractionally crystallized midcontinent wax was composed entirely of normal and isoparaffinic molecules. Two newly found normal paraffin molecules $C_{36}H_{74}$ and $C_{\text{[illegible]}}H_{8\text{[illegible]}}$ have never before been identified as constituents of paraffin wax. The X-ray method may be used to determine the purity and constitution of each fraction.

(C) AN X-RAY EXAMINATION AND SPECTROGRAPHIC ANALYSIS OF A PECULIAR INTERMEDIATE MANGANESE STEEL

A method of spectrographic analysis for manganese in steel has been devised for very small samples which is applicable to steels containing from 1% to 10% of manganese. A preliminary X-ray examination was made of a 4% manganese steel.

EDUCATIONAL CAREER

B.S., University of Illinois, 1928

M.S., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1927-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

PAUL KIMBRELL SMITH

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, June 3, 1931, 4 p. m.
Room 254, Mathematics Building

COMMITTEE IN CHARGE:

PROFESSOR ROBERT D. CARMICHAEL, *Chairman*
PROFESSOR ARNOLD EMCH
PROFESSOR HARRY LEVY
PROFESSOR ALFRED J. MARIA
PROFESSOR GEORGE A. MILLER
PROFESSOR ELMER H. WILLIAMS

OUTLINE OF STUDIES

Major Subject: Mathematics
First Minor Subject: Algebra
Second Minor Subject: Physics

Thesis: ON SOLUTIONS OF LINEAR PARTIAL DIFFERENTIAL EQUATIONS NEAR SINGULAR POINTS

SUMMARY

A solution,

$$x^{\mu} y^{\nu} \left[1 + \sideset{}{'}\sum_{i,j=0}^{\infty} a_{ij} x^{i} y^{j}\right],$$

analogous in form to the solution of Fuchs for an ordinary linear differential equation near a regular point, is found in this paper for a second order linear partial differential equation of an interesting special type in two independent variables.

After a transformation upon the original equation, the resulting equation is shown to have a formal solution of the type

$$1 + \sideset{}{'}\sum_{i,j=0}^{\infty} a_{ij} x^{i} y^{j}$$

A dominating equation for the transformed equation is set up. Upon subjecting the dominating equation to a certain transformation, an ordinary linear differential equation, possessing a regular singular point at the origin, was derived. Using this equation, it was possible to show that the dominating equation has an actual solution of the same type as that mentioned for the transformed equation. It then followed that the original equation possesses a solution of the form above.

In the latter part of the paper several types of solutions of the original equation are constructed using the basal solution. Also, certain properties of these solutions are indicated.

EDUCATIONAL CAREER

B.S., University of South Carolina, 1916

A.M., University of South Carolina, 1917

M.S., University of Chicago, 1925

Assistant in Mathematics, University of Illinois, 1928-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOSEPH GAIL STAMPFLI

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, June 1, 1931, 3 p.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor Carl S. Marvel, *Chairman*
- Professor Reynold C. Fuson
- Professor Charles T. Knipp
- Professor John H. Reedy
- Professor Worth H. Rodebush

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: THE PREPARATION AND REARRANGEMENT OF TETRAPHENYL-DI-TERTIARY-BUTYLETHINYLETHANE

SUMMARY

Tetraphenyl-di-tertiary-butylethinylethane has been prepared and characterized.

This hydrocarbon is completely associated at room temperature. It is cleaved by 40 per cent sodium amalgam but not by one per cent sodium amalgam. In solution it adds bromine easily and absorbs oxygen but does not yield a stable peroxide. It is unstable toward heat and even on standing at room temperature it gradually rearranges to the isomeric hydrocarbon, $C_{38}H_{38}$, which has been obtained in previous attempts to prepare tetraphenyl-di-tertiary-butylethinylethane.

Tetraphenyl-di-tertiary-butylethinylethane is more stable toward alkali metals than either hexaphenylethane or hexa-tertiary-butylethinylethane. It is intermediate between these two hydrocarbons in regard to ease of oxidation.

Some preliminary studies on the oxidation and reduction of the isomeric hydrocarbon, $C_{38}H_{38}$ have been made. This has led to the preparation of two new hydrocarbons but the structures of these compounds are still uncertain.

EDUCATIONAL CAREER

A.B., St. Louis University, 1927

Assistant in Chemistry, University of Missouri, 1927-1928

Assistant in Chemistry, University of Illinois, 1929-1930

Fellow in Chemistry, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WILLARD FRANCIS STANLEY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, September 17, 1931, 2:30 p.m.
Room 103, Vivarium Building

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UNIVERSITY OF ILLINOIS

Committee in Charge:

- Professor Charles Zeleny, Chairman
- Professor Leverett A. Adams
- Professor Victor E. Shelford
- Professor Fred W. Tanner
- Professor Harley J. Van Cleave
- Professor Henry B. Ward

OUTLINE OF STUDIES

Major Subject: Zoology (Experimental)
First Minor Subject: Zoology (Faunistic)
Second Minor Subject: Bacteriology

Thesis: THE EFFECT OF TEMPERATURE UPON WING SIZE IN DROSOPHILA

SUMMARY

1. In a homozygous inbred race of the vestigial-winged mutant of *Drosophila melanogaster* wing length was found to vary directly with the temperature, but not in direct proportion.

2. There is a critical temperature for wing length which occurs between 29.5 and 30° C. in the males, and between 30 and 31° C. in the females.

3. In homozygous inbred races of the wild, miniature and truncate strains of *D. melanogaster,* and in the heterozygotes of wild and vestigial, wing length was found to vary inversely with the temperature.

4. Body size of wild, vestigial and their heterozygotes was found to vary inversely with the temperature, the size of vestigial being affected very slightly between 17 and 27° C.

5. Temperature-effective periods for wing length have been determined for vestigial at 17, 27, 30 and 31° C., for wild at 17, 27 and 30° C., and for their heterozygotes at 17 and 27° C.

6. The effective periods for wild and the heterozygotes are roughly twice those of vestigial and occur much later in development.

7. In wild and the heterozygotes of wild and vestigial, in the vestigial males and in the vestigial females at 17, 27 and 31° C., the major effect of temperature upon wing length is its effect upon the velocity of the wing-forming process.

8. In the vestigial females at 30° C. the effect of temperature upon wing length was found to be due to a combination of its effect upon the velocity of the wing-forming process and upon the processes that control the length of the effective period.

9. Two hypotheses are presented to account for the action of the vestigial gene, one being based upon the production of a thermo-labial inhibitor and the other upon a deficiency theory, the later being favored because it is more in accord with known phenomena.

10. Both hypotheses necessitate the assumption that sex-linked accessory factors are present which influence the action of the vestigial gene.

11. Factors which modify the wings of the heterozygotes of wild and vestigial have been detected and found to be subject to selection.

12. At least a part of these modifying factors are sex-linked, are present in the vestigial stock used, and have been demonstrated to affect wing length of homozygous vestigial at 29.5° C., but it is doubtful that they account for all the sexual dimorphism encountered in this study.

EDUCATIONAL CAREER

A.B., North Central College, 1927

A.M., University of Illinois, 1928

Scholar in Zoology, University of Illinois, 1927-1928

Assistant in Zoology, University of Illinois, 1928-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

STELLA HELEN SUTHERLAND

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, June 2, 1931, 3:30 p. m.
Room 424A, Library Building

Committee in Charge:
- Professor Marcus L. Hansen, *Chairman*
- Professor Frederick C. Dietz
- Professor Walter Graham
- Professor Paul V. B. Jones
- Professor Laurence M. Larson
- Professor William S. Robertson

OUTLINE OF STUDIES

Major Subject: History

First Minor Subject: American History

Second Minor Subject: English Literature

Thesis: THE DISTRIBUTION OF POPULATION IN THE AMERICAN COLONIES IN THE REVOLUTIONARY PERIOD

Summary

The object of this study is to present geographically the location and tendencies of population in the thirteen colonies at the time of the American Revolution.

The difficulties of such a study are principally a matter of paucity of material. Census returns are available for only a few of the colonies; therefore estimates based upon the tax lists have been made. Except in Pennsylvania, these lists are in manuscript form in various depositories in Dover, Richmond, and Atlanta. The work of counting these tax lists was done personally during the summers of 1928, 1929, and 1930. These lists of taxable persons have been multiplied by five to estimate population, and to the number so found has been added the number of slaves, or servants, or both. In the case of Georgia, for which no lists are available, the "Head Grants," in the offices of the Secretary of State, at Atlanta, have been used.

This estimated population has been indicated upon a map. Because contemporary maps of the colonies were not drawn to the same scale, county and province lines have been transferred to a set of modern maps, on which one dot has been used to represent fifty persons.

The explanation of this distribution calls for extended investigation in order to understand the particular situation in each colony, but a few generalizations have been advanced. Outside of Boston, New York, and Philadelphia, where population growth is largely a matter of commerce and industry, the strongest factor in the distribution is soil fertility, even in regions remote from markets, such as the South Carolina Piedmont. Mountainous regions, because of their sterility, remained sparsely settled until mining and kindred industries developed. Accessibility by water, in days of primitive land transportation, was a powerful inducement to settlement. Wooded areas almost everywhere were drawn upon for commercial timber, while the pine forests supplied tar, pitch, and turpentine. Along the New England coast, fisheries and ship-building account, to some degree, for density. The age of a settlement, the type of labor used, the nationality of the colonists, and the system of landholding, together with the growth of a staple crop, are supplementary factors in explaining distribution.

The data presented provide a basis for significant studies of many features of colonial economic and political life, such as, the relative distribution of white and black population; geographic factors in expansion and in the relation of the course of settlement to the Indian; and land policies of the imperial and colonial governments.

EDUCATIONAL CAREER

A.B., Queen's University, 1920

A.M., University of Chicago, 1921

Assistant in English, University of Illinois, 1925-1926

Assistant in History, University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

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FINAL EXAMINATION

OF

JAMES OBED SWAIN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, December 22, 1931, 1:30 p.m.
Room 216, Lincoln Hall

Committee in Charge:

- Professor Arthur Hamilton, Chairman
- Professor David H. Carnahan
- Professor Régis Michaud
- Professor Walter S. Monroe
- Professor John Van Horne

OUTLINE OF STUDIES

Major Subject: Romance Languages (Spanish)
First Minor Subject: French
Second Minor Subject: Education

Thesis: VICENTE BLASCO IBÁÑEZ—EXPONENT OF REALISM

Summary

Vicente Blasco Ibáñez has attained an unusual popularity in the United States. Not only college and university libraries but even the small public libraries have copies of many of his novels. Only the critic of some decades hence will be able to decide whether or not this popularity is deserved.

When Blasco's first novel, *Arroz y tartana,* was published, critics, who are always anxious to discover influences and trends, saw a similarity between his writings and those of Émile Zola. Others have denied the influence of Zola and have insisted on that of Maupassant instead. One critic has classified Blasco as "Thoroughly realistic." The following question then presents itself: "Just what is the status of Vicente Blasco Ibáñez as an exponent of realism?"

After examining the writings of the most important theorists of realism and comparing their opinions we find that they agree on certain criteria. These may be included under six principal headings:

Careful Observation: Blasco Ibáñez is a careful, instinctive observer. He has the ability to see and describe those peculiar traits that make commonplace things, scenes, events and people stand out.

Significant Detail: Blasco has, on the whole, the ability to choose those details that we may call *significant* because they are useful in making the sensation of reality stronger.

Objectivity: Likewise, Blasco generally maintains the objective point of view considered necessary to realistic portrayal. Only in those works loosely classified as controversial does he allow his ideas to intrude on his art as a story teller.

Democratic Curiosity: Blasco is a true literary democrat. All sorts and categories of people and all kinds of scenes, actions and events are allowed a place in his works.

Avoidance of the Exotic: The choosing of the commonplace in preference to the exotic is a well marked tendency in Blasco's production.

Environment: In his judicious use of environment, (*local color, dialectic speech* and *contemporary historical events*), Blasco has again proved himself to be a realist.

In conclusion, one feels justified in saying, that although Blasco Ibáñez has failed in some insignificant respects to measure up to an exact realism, he remains one of the greatest of the recent exponents of realism.

EDUCATIONAL CAREER

A.B., Indiana University, 1921

A.M., Indiana University, 1923

Assistant in Romance Languages,
University of Illinois, 1929-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ROGER SPENCER SWEET

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, December 18, 1931, 2:30 p.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor Carl S. Marvel, Chairman
- Professor Edward H. Cameron
- Professor Reynold C. Fuson
- Professor John H. Reedy
- Professor Worth H. Rodebush

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Education

Thesis: THE REDUCTION OF ACETYLENIC CARBINOLS WITH TITANIUM TRICHLORIDE

Summary

1. Some new acetylenic carbinols have been synthesized and characterized.

2. The reaction of titanium trichloride with three acetylenic carbinols has been studied, and found to produce hydrocarbons which are not the expected hexa-substituted ethanes. Two diarylmonoacetylenic carbinols gave di-indene derivatives. Tri-*tert.*-butylethinylcarbinol gave a dichloro compound which could be converted to an isomer of hexa-*tert.*-butylethinylethane.

3. Some reactions of this isomer of hexa-*tert.*-butylethinylethane have been described.

EDUCATIONAL CAREER

B.A., University of Denver, 1927

M.A., University of Denver, 1928

Assistant in Chemistry, University of Illinois, 1927-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

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UNIVERSITY OF ILLINOIS.

FINAL EXAMINATION

OF

SARAH HELEN TAYLOR

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, May 25, 1931, 2 p.m.
Room 104, Administration Building

Committee in Charge:
- Professor Edward H. Cameron, *Chairman*
- Professor Arthur R. Crathorne
- Professor Walter S. Monroe
- Professor Charles W. Odell
- Professor Robert F. Seybolt

OUTLINE OF STUDIES

Major Subject: Education
Minor Subject: Mathematics

Thesis: THE EFFECTS OF CLASSIFYING COLLEGE STUDENTS ON THE BASIS OF THEIR PREVIOUS GRADES IN MATHEMATICS

SUMMARY

During the four years, 1926-27 to 1929-30 inclusive, the Mathematics Department of the University of Illinois conducted an experiment in sectioning students in analytical geometry, Mathematics 6, on the basis of their grades in college algebra and trigonometry. Complete statistical data are reported for sixty-six sections, fifty-five different instructors, and fourteen hundred students.

When the number of students registered at one hour was sufficient for three sections, students were divided into high, middle, and low sections on the basis of their previous grades in college mathematics. At each of several other hours two sections, one of high and one of low ability, were maintained. There were also six control sections each year in which there was no attempt at classification by ability. Within the first week of the semester the students in the experimental and in the control sections were given the mathematical aptitude and mathematics training tests constituting the Iowa placement tests. Groups of students in the experimental sections and groups of students in the control sections, whose scores in the Iowa tests were equal, were considered to have approximately equivalent mathematical training and aptitude. Such equivalent groups were then compared at the end of the semester on the basis of their test scores in analytics and the gain of one group over the other was considered to be a measure of the efficiency of the one method of sectioning as against the other.

At the end of six weeks, shifts were made between sections where three met at an hour. This shifting was on the basis of a uniform quiz and the work of the preceding six weeks. At the end of the semester the experimental and control sections were brought together for a combined section final examination given in two parts. The first part was a new type examination containing ninety questions of the short answer type. The second part was the customary old type or developmental examination in analytics. The scores from these two tests show a correlation from year to year which lies between .69 ± .02 and .71 ± .02.

The results of the June tests for the four-year period show a gain at all ability levels for the experimental sections. On the basis of the old type test the average difference between the experimental sections which were divided on the basis of high, middle, and low sections, and the control sections is 7.3% in favor of the latter; on the basis of the new type test, the average difference is 5%; and on the combined tests the average difference is 6.3%. These percentages are figured on the basis of the perfect test score. In terms of the average score made in the four years, the 6.3% becomes 12.5% of the average. The gain of the experimental sections as stated above is almost ten times the probable error of measurement. The students classified into high and low sections at an hour do not show as great a gain as is shown in the sections of three ability groups. This gain is about 4% in the old type test and less than 1% in the new type test. The experiment presents strong evidence of the advantage of sectioning classes in mathematics on the basis of previous grades if three or more sections meet at an hour, and some evidence for sectioning when two classes meet at an hour.

EDUCATIONAL CAREER

A.B., Illinois College, 1920
A.M., University of Illinois, 1922

Scholar in Mathematics, University of Illinois, 1921-1922

Teacher of Mathematics in University High School, University of Illinois, 1922-1931

PUBLICATIONS

"Oral Work in High School Algebra," *Mathematics Teacher*, vol. 17, January, 1924, pp. 35-45.

"Timed Tests as a Method of Drill in Algebra," Ed. Res. Cir., no. 47; Univ. of Illinois, November, 1926, pp. 22-26.

"The Mathematics Library and Recreational Programs," *School Science and Mathematics*, vol. 30, June, 1930, pp. 626-634.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

FRED HAROLD TURNER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 28, 1931, 10 a.m.
Room 104, Administration Building

Committee in Charge:
- Professor Robert F. Seybolt, *Chairman*
- Professor Edward H. Cameron
- Professor Walter S. Monroe
- Professor Charles W. Odell
- Professor Herbert Woodrow

OUTLINE OF STUDIES

Major Subject: Education
Minor Subject: Psychology

Thesis: THE ILLINOIS INDUSTRIAL UNIVERSITY

Summary

The material for this study has been secured almost entirely from letters, manuscripts, newspapers, periodicals, city and county records, state laws and reports, state house and senate journals, United States laws, United States house and senate journals, and the official records and publications of the university.

In 1851, a series of industrial conventions began which eventually led to the federal grant of public land upon which the Illinois Industrial University was founded. Previous to 1851, federal and state aid had been given to educational institutions. From a federal grant, Illinois had a college and seminary fund with which it might have established a state university many years before it did. Before the Granville meeting, private and denominational colleges were thriving in Illinois.

The Granville meeting of 1851 initiated the movement which resulted in the formation of the Illinois Industrial League, and a petition to Congress for a grant of public lands to endow a national system of industrial education. One bill to secure this grant passed both houses of Congress and was vetoed by President Buchanan. A second attempt was successful, and the grant was made by the Act of July 2, 1862.

The grant was accepted by Illinois, and from that time until the adjournment of the legislature in 1865, an effort was made to locate the university in Champaign county. In 1867, with four counties competing, and the original friends of the Industrial League trying to gain control of the fund, the Illinois Industrial University was placed at Urbana in Champaign county.

Due to charges of dishonesty, the location at Champaign was unpopular; and a year elapsed from the location at Urbana before the university was opened. There was violent opposition to it from all sides, and especially from those who feared it was to become simply a classical institution and not an industrial university.. Its progress was slow under Regent Gregory, who served from 1867 to 1880. It began as a modified classical institution, changed to a weak agricultural college, and under Regent Selim Peabody became an engineering college rather than an agricultural or classical institution. In 1885, it ceased to be the Illinois Industrial University, and became the University of Illinois. The administrative problems, the development of the curriculum, the physical plant, the financial difficulties, and the general progress of the university from its opening to the end of the year 1885, when the name was changed, conclude the history of the Illinois Industrial University.

EDUCATIONAL CAREER

A.B., University of Illinois, 1922

A.M., University of Illinois, 1926

Assistant Dean of Men, University of Illinois, 1922-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

KENTON FRANK VICKERY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, June 2, 1931, 9 a.m.
Room 108, Lincoln Hall

Committee in Charge:

Professor William A. Oldfather, *Chairman*
Professor Herbert J. Barton
Professor Howard V. Canter
Professor Joseph W. Swain
Professor Glenn R. Morrow

OUTLINE OF STUDIES

Major Subject: Classics (Greek)
First Minor Subject: Latin
Second Minor Subject: Ancient History

Thesis: FOOD IN EARLY GREECE

SUMMARY

Sheep, goats, swine, and cattle have been known in the Aegean world from neolithic times onward; they were domesticated long before the beginning of the age of metals; their flesh was used as food; and the milk of sheep, goats, and possibly cows, was drunk and made into cheese. Geese and pigeons were kept, but it is practically certain that chickens were unknown until historic times. The varieties of domestic animals used in Crete have in some cases been determined, the time of their first occurrence has been noted, and an attempt has been made to determine the order of their importance.

Wheat, barley, millet, anise, beans, coriander, peas, chick peas, lentils, vetches, almonds, figs, grapes, grape wine, and olives were known during the period in question, and there is reason to believe that the following were also known: apples, pears, calamint, celery, chicory, cucumber, garlic, leek, mint, plum, pomegranate, pumpkin, rampion, sesame, silphium, water parsnip, and two varieties of wormwood. The evidence for these has been classified and presented geographically and chronologically, and conclusions have been drawn as to where and when each can be proved or reasonably supposed to have been known.

Fishing was carried on at least from the beginning of the age of metals; before that the evidence is too scanty to warrant conclusions. Among the fish caught were the eel, flying fish, scarus, and tunny. Shellfish and probably other invertebrates were eaten from the earliest times onward. Frogs also were sometimes eaten. The Aegean peoples engaged in hunting, though probably in most cases it was not a regular means of livelihood, and, at least in the late period, it was an aristocratic sport. The game, from neolithic to the latest Aegean times, included wild boar, deer, in Crete the wild goat, rabbits, and hares; probably wild ducks, partridges, pheasants, and peacocks; and perhaps antelopes, hedgehogs, and the wild ox. They used hunting dogs, bows, spears, and, at least in the late period, they used nets and rode to the hunt in chariots. The lariat may also have been used.

The household equipment consisted largely of pottery, with some bronze and copper vessels. Both dry and liquid supplies were stored in pithoi, jars, and jugs; cooking was done over an open fire, on the spit, and in kettles and caldrons. They ate their food from a variety of dishes corresponding to bowls, plates, cups, and the like. The pottery vessels varied greatly in form, but the general types appear before the age of metals and persist throughout prehistoric times. Fixed clay hearths were generally used in Greece, but do not appear in Crete after neolithic times. Ovens were known, but were not common, in the earlier periods in Thessaly; elsewhere nothing has been discovered that can with any assurance be called an oven.

The basis of the evidence used in this study has been the actual remains of food and utensils, but use has also been made of the studies of the pre-Greek elements in the Greek language; the art of Minoan Crete and Mycenaean Greece; the relations of the several parts of the Aegean world with one another and their neighbors, and the traditions and cults of historic Greece.

EDUCATIONAL CAREER

A.B., Augustana College, 1925

A.M., University of Illinois, 1926

Scholar in Classics, University of Illinois, 1925-1926

Assistant in Classics, University of Illinois, 1926-1929

Fellow in Classics, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WALTER GEORGE WARNOCK

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 29, 1931, 4 p.m.
Room 254, Mathematics Building

Committee in Charge:
- Professor Arnold Emch, *Chairman*
- Professor Robert H. Baker
- Professor Robert D. Carmichael
- Professor Alfred J. Maria
- Professor George A. Miller

OUTLINE OF STUDIES

Major Subject: Mathematics
First Minor Subject: Analysis
Second Minor Subject: Astronomy

Thesis: ON THE GEOMETRY OF GROUPS OF LINE CONFIGURATIONS

SUMMARY

The fundamental identity of Plueker Line Coordinates is subjected to the substitutions of a group G_{48} giving rise to forty-eight distinct lines. The connection with the identity $\sum_1^6 x_i^2 = 0$ is shown. The invariant subgroup of order eight leads to a $\triangle_8$ configuration. Eight types of lines are shown to exist giving a complete system of 384 lines. The eight types consist of two sets such that any line of one set intersects four lines of each type of the other set. The intersections of the lines lie in sixteen planes.

The $\triangle_8$ configuration is studied with respect to quartic curves; three cases are considered, (i) quartics with one double point, (ii) quartics with two double points, (iii) rational quartics.

The configurations on four, five, and six lines in connection with quadrics and their intersections are considered. The triple systems $\triangle_7^3$ and $\triangle_9^3$ and their associated conjugates are interpreted in line geometry.

EDUCATIONAL CAREER

B.A., Mount Allison University, 1926

M.A., Mount Allison University, 1928

Assistant in Mathematics, University of Illinois, 1927-1930

Fellow in Mathematics, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RICHARD LOCKWOOD WEBB

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 28, 1931, 10 a. m.
Room 305, Research Laboratory

Committee in Charge:
- Professor Otto F. Kampmeier, Chairman
- Dean David J. Davis
- Professor Robert M. Oslund
- Professor Franklin P. Reagan
- Professor William H. Welker

OUTLINE OF STUDIES

Major Subject: Anatomy
First Minor Subject: Embryology
Second Minor Subject: Physiology

Thesis: A STUDY OF PERITONEAL REACTIONS WITH ESPECIAL REFERENCE TO MAST CELLS

SUMMARY

A relative cell count of the peritoneal fluid of normal rats was established. Changes in the relative distribution of cells were observed on successive days after the injection of egg albumen and after the injection of particulate matter.

In a study of the omentum a proliferation of the "milk spots" of the omentum was observed after the injection of egg albumen. It was found that particulate matter is stored in these areas. A solution of potassium ferrocyanide and iron and ammonium citrate was absorbed by the omentum at the areas of the milk spots.

Significant differences in the cytologic appearance of the mast cells occurred after the injection of these various substances.

EDUCATIONAL CAREER

A.B., University of Illinois, 1924

M.S., University of Illinois, 1925

Assistant in Zoology, University of Illinois, 1924-1926

Instructor in Anatomy, University of Illinois, 1926-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

OREN LESLIE WHALIN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, October 23, 1931, 1:30 p. m.
Room 420, Commerce Building

Committee in Charge:
- Professor Charles L. Stewart, Chairman
- Professor Ernest L. Bogart
- Professor Harold C. M. Case
- Professor Merlin H. Hunter
- Professor Laurence J. Norton
- Professor Henry P. Rusk
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: Economics

First Minor Subject: Agricultural Economics

Second Minor Subject: Animal Husbandry

Thesis: COMMERCIAL RED WINTER WHEAT OF THE CORNBELT: AN ECONOMIC STUDY

Summary

Red winter wheat is the second most important sub-class of wheat produced in this country. The principal commercial red winter wheat belt which is centered in the states of Ohio, Indiana, Illinois and Missouri produces about 50 per cent of the total crop.

Soft winter wheat flour is especially desired for use in high-grade pastries and for biscuits and is used to a lesser extent in doughnuts and crackers. It lacks both strength and water-absorbing power, however, for general use in commercial bread making. Of the flour milled, 15 per cent was consumed locally. Another 15 per cent went east and most of the remainder found a market in the South.

A study of available data indicates that the consumer's dollar, spent for bread, has been divided into about 22 cents to producers, 34 cents for cost of marketing, 30 cents for cost of processing and ingredients added, and 14 cents to processors and merchants for profits.

Prices of red winter wheat have reacted somewhat inversely to the size of the red winter wheat crop and have been influenced to a lesser degree by prices of hard winter wheat. The seasonal reactions of price of red winter wheat have often been inverse to those of hard spring. Flour prices have followed wheat prices very closely. Bread prices have been much less sensitive to wheat prices than have flour prices.

Present indications are that red winter wheat production in the corn belt will decrease somewhat in response to low prices.

Soft wheat mills in the area of production have been decreasing in number at about the same rate as mills in general and increasing in size accordingly. They have been increasing their storage facilities and organizing their operations on a somewhat more businesslike basis, particularly in respect to marketing.

A considerable inroad has been made on the use of soft winter wheat flour for biscuit consumption in the South since 1928 because of price competition with lower grades of hard winter wheat flour. On the other hand, the better pastry producers have increased their consumption of high grade soft winter wheat flour and the millers look for further increase in demand from that source.

The red winter wheat industry is especially in need of improvement of the quality of wheat produced and of more formal cooperation for developing improved, uniform standards in the industry, for cutting costs of distribution, for providing needed information throughout the industry, for a general constructive program of advertising, and for an extensive, progressive program of research into the use of red winter wheat products.

EDUCATIONAL CAREER

B.S., University of Illinois, 1918

M.S., University of Illinois, 1925

Assistant in Agricultural Economics, University of Illinois, 1925-1926, 1927-1928

Professor of Economics and Business Administration, Illinois Wesleyan University, 1928-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JULIUS WHITE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, June 1, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor Roger Adams, *Chairman*
- Professor B. Smith Hopkins
- Professor William C. Rose
- Professor Ralph L. Shriner
- Professor Fred W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physiological Chemistry
Second Minor Subject: Bacteriology

Thesis: I. CATALYTIC REDUCTION OF KETONES
II. STEREOISOMERISM IN THE DIPHENYL SERIES
(Synthesis and resolution of 2, 2′, 4, 4′, 6, 6′-hexachloro-3, 3′-dinitro-5, 5′-dicarboxydiphenyl)

SUMMARY

I. Ketones of various types have been reduced catalytically to the corresponding alcohols and a study of the effect of various salts made on the rate of reduction. Low concentrations of salts had no effect; high concentrations of these salts caused the reductions to become sluggish or to poison completely the catalyst.

In each instance the ketone was reduced to the alcohol. No trace of hydrocarbon was observed.

II. A study of a diphenyl with the 2, 2′, 6, 6′ positions filled with the same group and each ring asymmetric has been made with the intention of determining whether it could be resolved or not. 2, 2′, 4, 4′, 6, 6′-Hexachloro-3, 3′-diaminodiphenyl was prepared but because of the weakly basic properties of the amino group, salt formation could not take place and thus any attempt to resolution was made impossible.

2, 2′, 4, 4′, 6, 6′-Hexachloro-3, 3′-dinitro-5, 5′-dicarboxydiphenyl was successfully prepared by converting trichloro m-toluidine to 2, 4, 6-trichloro-3-iodotoluene. This was coupled by means of copper bronze to give 2, 2′, 4, 4′, 6, 6′-hexachloro-3, 3′-dimethyldiphenyl. Oxidation with a mixture of nitric acid and potassium permanganate gave the 2, 2′, 4, 4′, 6, 6′-hexachloro-3, 3′-dinitro-5, 5′-dicarboxydiphenyl. Its resolution into optical antipodes has been partially completed.

EDUCATIONAL CAREER

A.B., University of Denver, 1925

A.M., University of Denver, 1926

Assistant in Chemistry, University of Illinois, 1926-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LEWIS WARD WILLIAMS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 26, 1931, 10 A.M.
Room 104, Administration Building

COMMITTEE IN CHARGE:

PROFESSOR WALTER S. MONROE, *Chairman*
PROFESSOR EDWARD H. CAMERON
PROFESSOR CHARLES T. KNIPP
PROFESSOR CHARLES W. ODELL
PROFESSOR ROBERT F. SEYBOLT

OUTLINE OF STUDIES

Major Subject: Education
First Minor Subject: Secondary Education
Second Minor Subject: Physics

Thesis: TURNOVER AMONG SECONDARY TEACHERS IN ILLINOIS

SUMMARY

This study is an investigation of the turnover among high-school teachers of Illinois. It covers the ten year period beginning in the fall of 1921 and ending in the spring of 1931. Turnover is used in the sense of replacements, additions to the staff being omitted from consideration. The sources of data used were the directories of teachers issued by the State Department of Education, the records in the office of the High School Visitor of the University of Illinois, a questionnaire sent to 2500 teachers and a questionnaire sent to all of the high school principals in the state.

The main findings of the study follow: (1) Turnover has varied from 50% to 15% for various groups of schools, schools with 8 or fewer teachers very largely contributing the higher percentages. (2) There has been a slow but rather steady decrease in turnover during the period studied. (3) The turnover among principals has been less than among teachers but in other respects, shows the same characteristics. (4) With the exception of Industrial Education which shows considerably less turnover than the others, the main subject matter fields all show about the same amount of turnover. This probably indicates that causes for turnover are not inherent in subject matter. (5) The chief causes for turnover as given by teachers are professional factors, economic factors, geographical factors, political factors and individual factors. Principals give professional factors, economic factors, political factors, refusal of board to reappoint and social factors, in the order named. In the judgment of principals, refusal of board to reappoint is the third chief cause for turnover among teachers instead of seventh as given by the teachers themselves. (6) There appears to be little relation between years of experience and cause of turnover. In general, teachers of long experience have made very few changes.

That there is a close relation between efficiency of a school system and turnover is probable. Therefore, it is urged that steps be taken to reduce turnover in Illinois. Improved methods of selection, selection by those trained for the responsibility, more effective methods of selecting candidates for and in training for teaching, more professional means of eliminating inefficient teachers and a tenure law for Illinois are means advocated.

EDUCATIONAL CAREER

Ph.B., Hiram College, 1909

A.M., University of Illinois, 1918

Assistant and Instructor in Education, University of Illinois, Principal University High School, 1918-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HAROLD BOWEN WILLMAN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, June 1, 1931, 2 p.m.
Room 241, Natural History Building

Committee in Charge:
- Professor William S. Bayley, *Chairman*
- Professor William O. Blanchard
- Professor George L. Clark
- Professor Waldorf V. Howard
- Professor Terence T. Quirke
- Professor Thomas E. Savage

OUTLINE OF STUDIES

Major Subject: Geology
First Minor Subject: Economic Geology
Second Minor Subject: Inorganic Chemistry

Thesis: GENERAL GEOLOGY AND MINERAL RESOURCES OF THE ILLINOIS DEEP WATERWAY FROM CHICAGO TO PEORIA

SUMMARY

The Illinois deep waterway now under construction will provide a 9-foot channel connecting Lake Michigan with Mississippi River by way of Chicago River, Des Plaines River and Illinois River.

A field study of the deposits of non-metallic minerals, excepting fuels, near the waterway was undertaken to determine the distribution, amount and uses of such materials. A large number of undeveloped deposits of limestone, dolomite, clay, shale, sand and gravel were studied and are described in detail. Many of these deposits have not been of economic importance because of lack of transportation but will probably become valuable with completion of the waterway.

As a background for the economic studies the stratigraphy of the region is summarized. In the Pennsylvanian system several changes are made in previous correlations. The coal formerly correlated with Springfield (No. 5) coal is shown by the present study to be equivalent to the Herrin (No. 6) coal of western Illinois. A number of members in the Pennsylvanian section of western Illinois not previously known to occur along the La Salle anticline are recognized and described; namely the Oak Grove limestone, the No. 4 coal, the beds associated with Springfield (No. 5) coal, the cap rock of Herrin (No. 6) coal, the Lonsdale limestone, and others.

A series of distinctive beds including a black, fissile shale with abundant remains of the pelecypod Aviculopecten rectilaterarius in the lower few inches and a unique limestone conglomerate are traced from near Morris in Grundy county to La Salle. The same beds were found at Cambridge in Henry county and near Kickapoo in Peoria county where they have been correlated with the Springfield (No. 5) coal of western Illinois. The limestone conglomerate which rarely exceeds 6 inches in thickness has been traced over 100 miles.

EDUCATIONAL CAREER

A.B., University of Illinois, 1926

A.M., University of Illinois, 1928

Assistant in Geology, University of Illinois, 1926-1928

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THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WALLACE WINDUS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, June 2, 1931, 3 p.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor Carl S. Marvel, *Chairman*
- Professor Vincent duVigneaud
- Professor William C. Rose
- Professor Ralph L. Shriner
- Professor Fred W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physiological Chemistry
Second Minor Subject: Bacteriology

Thesis: THE SYNTHESIS AND RESOLUTION OF METHIONINE

SUMMARY

1. Methionine (γ-methylthiol-α-amino-n-butyric acid) has been synthesized.

2. The synthetic γ-methylthiol-α-amino-n-butyric acid has been resolved and the l-isomer has been shown to be identical with natural methionine.

EDUCATIONAL CAREER

A.B., University of Montana, 1925

A.M., University of Illinois, 1928

Assistant in Chemistry, University of Illinois, 1927-1931

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN CHARLES ZIMMER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 28, 1931, 9 a.m.
Room 176, Chemistry Building

Committee in Charge:
- Professor George L. Clark, *Chairman*
- Professor Duane T. Englis
- Professor Reynold C. Fuson
- Professor Charles T. Knipp
- Professor Ralph L. Shriner

OUTLINE OF STUDIES

Major Subject: Chemistry (Analytical)
First Minor Subject: Organic Chemistry
Second Minor Subject: Physics

Thesis: A CRITICAL EXPERIMENTAL AND THEORETICAL STUDY BY X-RAY DIFFRACTION METHODS OF PARTICLE SIZE AND STRUCTURE IN THE SUB-MICROSCOPIC AND MICROSCOPIC REGIONS

SUMMARY

The various equations relating diffraction band width to the particle size of crystalline colloids have been discussed, and shown to be in agreement if all conditions assumed in their development are fulfilled. A qualitative comparison has been made of the particle sizes of colloidal gold from ultramicroscopic and X-ray diffraction determinations. The latter method gave smaller values as was expected. A number of colloidal systems were studied by X-ray diffraction and the theories of Von Weirman and Haber have been verified and extended.

Investigation of three series of annealed brass and one of low carbon steel showed a linear relation between the image length on the diffraction pattern and the microscopically determined grain size, which permits the determination of the latter quantity in the range of 10 to 100 microns. The factors in this relationship have been determined. They prove that the apparatus must be experimentally calibrated since these factors vary with the grain size. In a few cases the relationship did not hold and the cause of failure was a preferential orientiation of large grains.

A number of iron-tin alloys from 0 to 100 per cent tin content were prepared and studied by X-ray diffraction methods. The expansion of the elementary cube of iron due to solid solution of, up to 12 per cent, tin has been measured. The compound $FeSn_2$ was prepared in the form of single crystals shown to possess tetragonal symmetry, and the probable unit cell dimensions were calculated.

EDUCATIONAL CAREER

B.S., University of Nebraska, 1927

M.S., University of Nebraska, 1928

Assistant in Chemistry, University of Illinois, 1928-1930

Fellow in Chemistry, University of Illinois, 1930-1931

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UNIVERSITY OF ILLINOIS
THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LEONARD MARION ZINGLER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Thursday, May 21, 1931, 3 p.m.
Room 215, Commerce Building

Committee in Charge:
- Professor Horace M. Gray, *Chairman*
- Professor Merlin H. Hunter
- Professor Maurice H. Robinson
- Professor Hiram T. Scovill
- Dean Charles M. Thompson
- Professor Nathan A. Weston

OUTLINE OF STUDIES

Major Subject: Economics
Minor Subject: Accountancy

Thesis: FINANCIAL HISTORY OF THE CHICAGO STREET RAILWAYS

Summary

An accurate exposition of the financial history of the Chicago street railway development is the main objective of this work. It is also the purpose of this thesis to make a broad survey of the particular companies in order to learn the problems common to their expansion, to determine their intercorporate connections, to consider the methods and results of financing their construction, to view the changes in local regulation and to gain an insight into the prospective soundness of the industry. In this discussion of street railways there are included those companies enfranchised to operate only upon surface tracks in the City streets. The salient facts concerning incorporation, franchises, management, capitalization, earnings, traffic statistics and intercorporate relations are presented for all of the Chicago companies from 1859 through 1930. The financial problems occasioned by the costly experimentation in types of motive power and the replacement of the horse railway system by cable construction and cable, in turn, by the overhead trolley, are dealt with at length. The franchise legislation during the entire period is set forth as serious legal difficulties have existed between the City of Chicago and the street railway companies ever since the passage of the first ordinances. The shift in franchise policy from the determinate to the interminable grant and the bearing of the life of the grant upon financial and maintenance problems is viewed. A section of the conclusion is devoted to the major aspects of earnings and operations. An analysis of the methods of financing, of the capitalization per mile of track, and the consequences encountered by the companies and the security holders as a result of particular cases and policies of issuing securities, concludes the thesis.

EDUCATIONAL CAREER

A.B., Lawrence College, 1928

A.M., University of Illinois, 1929

Scholar in Economics of Public Utilities, University of Illinois, 1928-1929

Fellow in Economics of Public Utilities, University of Illinois, 1929-1931